COAL AGE

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Mention Wall Street and a man's thoughts turn to money; speak of graft, and the mental echo is politics. June signifies roses, sunshine, near vacations, and as the poet would say, "heavenly communion with nature." The exclamation—coal mines!—carries with it thoughts of darkness, danger, hard labor and callous hands. 'Tis the antonym of "Angels' Abode" and the synonym of "Hades."

Thus the nimble mind unconsciously and involuntarily correlates words and ideas into related groups. The mention of one thing brings the suggestion of another. We can no more think of "mine inspection" without classifying it with human courage, and the exercise of prudence, than we can draw brain pictures of a sturdy "smith" having the white, limp arms of a ribbon clerk.

Today our hats are off to every coal-mine inspector in America. We are glad for the opportunity of paying him even this small homage and dedicating one issue of "Coal Age" to him. It's the least he deserves, for the modest biographies that appear on succeeding pages bear conclusive evidence to the fact that silver spoons and trained nurses were conspicuously absent on important business when he first saw the light of day.

The only nurse most of them remember was called mother; she had gray hair and the tenderest ways; that's why these men grew up so straight and strong and so able to look out for themselves at an age when other boys were still tied to the proverbial "apron strings." The dark recesses of mother earth were their playgrounds, and if any of them have now advanced in years and position to the point where they can require that others "bear the yoke and serve the stroke," it's only a hard-won reward for years of earnest, diligent service.

Few are the renegades that enter amongst them, since theirs is a labor that calls every bluff. The test of the mines is heated and sure, and lack of ability, experience, nerve and spine are shown up as if exposed to the bright rays of a spot-light. The preservation of human lives is a serious work and demands men fully able to submerge thoughts of self and only be conscious that fulfillment of duty is the highest end and aim.

Dedicate one issue of our paper to the mine inspector! Why, sir, the pleasure is all our own; we would like to consecrate a far greater service to him and his cause than such small recognition of his worth. It's easy enough to be a hero when bands are playing and the multitude look on and cheer. We add our mite to the honor due brave men who can steam through ice-laden seas to the rescue of those in peril; but their work was a summer's vacation, a May-day party, compared to a dash underground, where less than the flicker of a flame sends each and all to eternity.

The public doesn't know; they can't understand. If they did, some of our inspectors would have walked home many times on strewn roses to the tooting of whistles, whereas the only sound they heard was the tolling of bells to the measured tread of bereaved wives and children. Courage is doubly courage when passive, and moral heroism is greatest when exercised in humblest spheres and circles unnoticed.

Some men are bold, others are brave. Boldness is often inspired by ignorance; true bravery can only be exhibited when there is a full understanding of the perils that confront us. The really courageous man never exposes himself needlessly to danger, but is sure in action when occasion arises, and his heroism is contagious to all who surround him.

'Tis the mine inspector who knows best that unwarrantable haste is the direct road to error. That it is better to prevent a calamity than to mend it afterward. Sorry the day when his efforts are hampered by rotten laws, his manhood impaired by corrupt and selfish mine owners, or his hands tied and his office entwined by the suctorial tentacles of state or local politics.

The Coal Mine Inspector

By Damon Runyon

(In the *New York American*)

Main North vomits a fearful roar,
and seventy men are in the hole;
Whites and blacks and a Jap or
two, but possibly never a living
soul.
Probably not, but there may be one.
Is there a man who will go and
see?
Swinging a safety lamp he comes,
and, God! What a man of men
is he!

Overalled, capped, steady and
grim;
Bobbing his head as he goes
within—
Shoving the weeping girls aside:
"Don't let them follow me down!"
he cried.
Into the dismal pit he goes
By the light of the lamp that
faintly shows
Where the dead lie still in
mournful rows—
God! What a man of men is he!

Main North's mouth breathes the
breath of Hell; its guts are rotted
with afterdamp,
But God and the state send a man
to see, and he goes searching with
a safety lamp.
Death lurks below, but it hides its
face from one who passes so
carelessly,
Poking his light in its very eyes—
God! What a man of men is he!

Grease and grime to the roots
of his hair;
Blear-eyed, bleeding, as he
tests the air—
Examines the roof and tests the
ribs, and notes where the dead
must be:
Over the falls of treacherous
shale;
Ears sharp set for a human hail—
On he goes down the Death-
wind's trail—
God! What a man a man can be!

It's a hundred to one that never a
man has lived for a moment after
the blast—
But the mine inspector 's a "*one-
chance man*" and he follows that
chance from first to last.
Women pray at the mouth of the
pit as the bodies are brought out
silently—
Down in the depths he toils for them.
God! What a man of men is he!

Listens and hopes for a human
cry;
Feels of the dead as he passes
them by—
Feels for the tunk of a human heart
where the forms stretch silently.
Follows a hope however slim;
Maps a path through the chaos
grim
For the rescue gangs that must
follow him—
God! What a man a man can be!

Who's Who—Among Mine Inspectors

Brief Sketches of Prominent Coal Mine Inspectors and Some of Their Ideas

Pennsylvania

James E. Roderick was born in South Wales, January, 1842. He attended school until the death of his father, when, at the age of 13 years, he entered the mines. He continued his studies, however, attending night school until he came to this country, in the early sixties. Mr. Roderick then located, first, at Pittston, Luzerne County, where he was engaged as a miners' laborer. Afterward he worked as a miner, doing all kinds of labor in the mines around Pittston and Wilkes-Barre, until Jan. 1, 1866, when he was appointed mine foreman of the Empire Shaft, operated then by the Wilkes-Barre Coal & Iron Company.

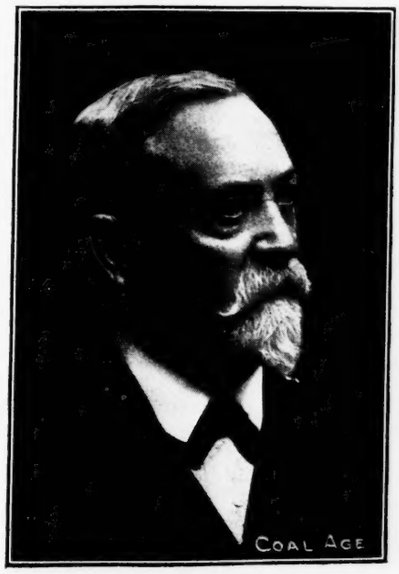
On the first day of June, 1870, he resigned that position to accept the superintendency of coal mines for the Warrior Run Mining Co. In June, 1881, he went before the board appointed to examine applicants for the position of mine inspector; and, having answered over 90 per cent. of the questions asked, he was appointed inspector of mines, with headquarters at Hazleton. He served as mine inspector until June 1, 1889, when he resigned that position to become the general superintendent of the coal interests of Linderman & Skeer. At the expiration of the lease of Linderman & Skeer, June 1, 1896, Mr. Roderick became general superintendent and manager for A. S. Van Wickle's extensive coal interests.

Appointed Chief of the Bureau of Mines in 1899

Mr. Van Wickle having died, Mr. Roderick resigned his position, June 1, 1899, to accept the appointment to the office of Chief of Bureau of Mines, under Gov. Stone. He served in that position until Apr. 15, 1903, when he was appointed by Gov. Pennypacker, as chief of the newly established Department of Mines, for a term of four years. In 1907, he was reappointed by Gov. Stuart, for a third term of four years, and, in 1911, was reappointed by Gov. Tener, for a fourth term of four years.

Mr. Roderick was appointed by Gov. Beaver, in 1888, as one of the commissioners to build the Middle Coal Field State Hospital, located at Hazleton, and was elected president of the commission. He was afterward appointed by Gov. Pattison, in 1890, as one of the trustees of the said state hospital, and at the present time is the president of the board of trustees of that institution. He has served as school director and as select councilman for one term, at his home in Hazleton, where he has lived since July, 1881. He is a member of the First Presbyterian Church of that place, and is a director in the Hazleton National Bank.

Under Mr. Roderick's supervision, seconded by a faithful and efficient corps of district inspectors, the work of mine inspection, in Pennsylvania, has been made very effective. The force now numbers, in addition to the office force at Harrisburg, which is in charge of deputy chief Frank Hall, 21 inspectors in the anthracite region and 25 in the bituminous region, making a total of 46 district mine inspectors.



James E. Roderick

Mr. Roderick served on the commission appointed to revise the bituminous-mine law of Pennsylvania, which revised law was approved June 9, 1911. At present he is employed on the commission appointed to revise the anthracite-mine law of the state.

Mine Inspectors' Examining Boards

Speaking of the examination of candidates for the office of mine inspector, Mr. Roderick states that the appointment of the one board of examiners, by the governor, every four years, in the bituminous region, has been the practice since 1877, and has given general satisfaction. Contrasting this with the four examining boards appointed by the courts of Luzerne, Lackawanna, Schuylkill and Susquehanna Counties, Mr. Roderick adds:

"The present method in the anthracite region has been in vogue for ten years and has never given satisfaction. In addition to passing a successful examination, applicants for the position of mine inspector are compelled to run the gauntlet of being elected by the people, of whom not more than 25 per cent. are miners. This is a most vicious practice and is unsatisfactory to all the interests concerned. An inspector elected by popular vote is always more or less in fear of giving some offense that may jeopardize his chances for reëlection, and cannot be a free agent to enforce the provisions of the mine law, as he would desire. Although mindful of his duty, he endeavors to satisfy everybody, and, as a result, he fails to satisfy either the operator or the miner; he is not successful even in satisfying himself, and frequently is far from satisfying the Department.

"An additional argument against the continuance of this system lies in the fact that the mine inspector who is elected does not come as closely under the supervision of the chief of the Department of Mines as the inspector who is commissioned by the governor. Such a condition, at times, mililates against the better interests of the service.

Qualifications Most Essential in Mine Inspectors

"The anthracite inspectors, like those of the bituminous region, should be commissioned by the governor, after having passed a successful examination before a board of examiners named by the governor. The inspector when first commissioned should be a man between 35 and 50 years of age, in good physical condition; a practical miner, and capable to act as a mine foreman or superintendent. He should be well versed in the English language, a fair penman, a good mathematician, familiar with the science of coal mining and possessing the qualifications of a mine engineer to an extent that will enable him to read a mine map intelligently and plot correctly a cross-section therefrom. He must also have a knowledge of electricity that will make him a judge of the electrical installations in a mine. He must also be a man of moral character, sober, industrious and of unquestioned integrity. The standard for the office of mine inspector cannot be placed too high, as it is a position of great responsibility, having to do with the welfare of the employees, their life and health, and the protection of the property of the operator."

West Virginia

On Dec. 22, 1908, John Laing took oath of office as Chief of the Department of Mines of West Virginia. His term of office expires July 1, 1913, and although he expects to serve until the end of his appointment, he will not accept the office for another four-year period.

Mr. Laing was born in Falkirk, near Glasgow, Scotland in 1865, and was less than two years old when his father and grandfather emigrated to this country.

John entered the mines in Pennsylvania at nine years of age, and he has been engaged in the coal business ever since. At the present time Mr. Laing is the principal stockholder and president of several coal companies in West Virginia. He has accumulated a considerable fortune and is one of the wealthiest mine inspectors in this country. Having started without an education and with no other assets than good health, determination and a likable personality, he has fought his way to an enviable position of influence in the coal industry of America.

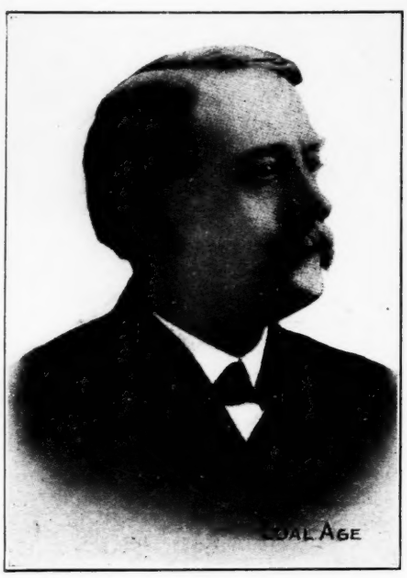
JOHN LAING

Illinois

The subject of this sketch, Martin Bolt, was born Sept. 23, 1871, at Iron Ridge, Wis., and moved into La Salle County Illinois with his parents soon after. Mr. Bolt is of English extraction; his father and mother were born in Devonshire and came to America in 1858. Young Bolt entered school at LaSalle where he attended until 12 years of age; going into the mine soon after, he worked in almost every line of mine work for about 23 years. He attended night school whenever the opportunity offered and secured a teacher's certificate and taught school one term, going back into the mine at the end of the year.

Martin Bolt was appointed secretary of the State Mining Board, March 27, 1907, by Gov. Charles S. Deneen; serving in that capacity until the board was reorganized July, 1911, Mr. Bolt was then made chief clerk, which position he still occupies.

MARTIN BOLT



JAMES TAYLOR

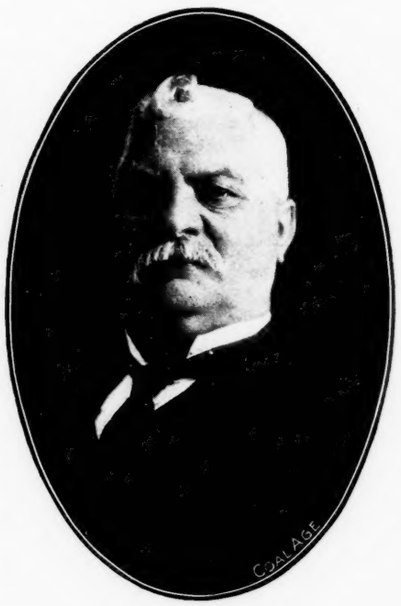
The mining laws of Illinois provide for the appointment of a mining board composed as follows: Two practical coal miners, one practicing coal-mine hoisting engineer, and two coal operators. The board has control and direction of the work of the state mine inspectors who are required to make monthly reports of all inspections made by them; also a report of all fatal accidents which occur in their respective districts.

The plan for handling special complaints is to refer them to the inspector from whose district they come, with instructions to make an immediate investigation and report conditions to the office of the state mining board. This has reduced complaints materially and will in time bring them down to a minimum.

Ohio

The Harrison family register records that George was born at Greenhead, Northumberland County, England, Apr 30, 1846. While he stoutly affirms that he was present at the time, he does admit that his memory is not sufficiently retentive to corroborate the accuracy of the family records.

Because of the ill health of his father, caused by inhaling the deadly carbonic-acid gas (blackdamp) and other impurities in the mine air, it was necessary for him to assume life's burden at the tender age of seven years and eight months. It was thought that his father would soon recover and he would have an opportunity of receiving at least the first rudiments of a common school education. But such was not the case, and after a lingering illness the pit claimed its victim and the Harrison family lost a loving husband and affectionate father, as many other coal-mining families have in the past, and no doubt will in the future. The die was cast against Mr. Harrison as he was thus left with three sisters, two younger brothers and a widowed mother, which doomed his chances for an education.



GEORGE HARRISON

At that time the boys were compelled to work 12-hour shifts ordinarily, thou

more often 14 or 15 hours would elapse between the time they left home in the morning and returned at night, thus never seeing daylight except on Sunday, a greater part of the year. His mother, while worknig nearly day and night to maintain the family, nevertheless found time to aid George toward an education and to her he feels wholly indebted for what assistance he ever got in this way.

When 16 years old Mr. Harrison's family moved to Leadgate, County of Durham, and he commenced to do a man's work in the mines. It was always his ambition to be thoroughly practical and expert at all kinds of work, and the sad end of his father had made such an impression on his boyish mind that he developed a fierce hatred for interfering with ventilation in a mine or deceiving the miners in regard to it. The use of dangerous or improper illuminants always aroused his anger to a white heat.

Mr. Harrison recalls that until the year 1872 miners were obliged to sign a bond binding them at the same mine for one year. By promises of preference work they were often induced into signing away their liberty, and those who deserted were often brought back and sent to prison. Mr. Harrison thanks God that he never had anything to do with the yearly bond, except as an advocate for its abolition, which was accomplished by the Mines Regulation Act, passed in 1872, the first complete mining measure enacted by the British Parliament.

Mr. Harrison went to Cambridge, Guernsey County, Ohio, Apr. 29, 1880, and was followed four months later by his wife and seven children, five girls and two boys, all under 12 years of age. It is one of Mr. Harrison's proud boasts that a woman did think enough of him to cross the Atlantic under the conditions which prevailed in those days and with such a charge, just for him.

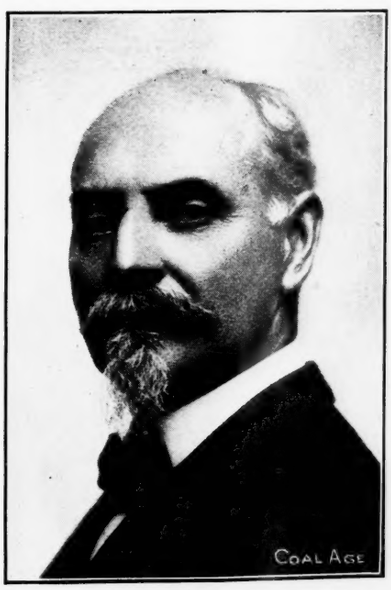
George Harrison spent nearly seven years as a practical miner in Ohio, during all of which time he was actively connected with the labor organizations. For nearly 18 years he was engaged in the management of mines and has served in his present official capacity as chief inspector of mines in Ohio for eight years.

Kentucky

Charles Joseph Norwood, chief inspector of mines, is of Kentucky lineage, but was born at New Harmony, Ind. His father at the time was state geologist of Illinois, and had been principal assistant geologist under David Dale Owen in the government's survey of the Northwest.

Young Norwood's early days were passed amid the scenes of the Civil War, which tended toward early maturity in those days, regardless of age. During this period he lived at Columbia, Mo., where his father was a professor in the State University.

Mr. Norwood's life has been a rather busy one, ever since he attained the age of 18. As assistant in his father's chemical laboratory at that age he verified the contention of the Missouri State Geologist that the southeast Missouri tin strike was a fake. He was later an assistant on the Missouri Geological Survey under Raphael Pumpelly in 1872 and was promoted to be assistant geologist in 1873 by Pumpelly's successor, G. C. Broadhead. While serving in this capacity he published the first formal list of fossils from the upper coal measures of Missouri, which was embodied in Pumpelly's report. He was also the author of various portions of the Broadhead report.



C. J. NORWOOD

In 1874, "Charles Joseph" transferred the scene of his activities to Kentucky, where he was assistant geologist under N. S. Shaler, from that time until 1880, having charge of the Western Kentucky coalfield; a portion of this time, from 1877 to 1881, he was engaged as professor of Natural Science at Bethel College, Kentucky. During the period 1882 to 1883 he severed his connection with the coal industry and assumed charge of some silver mines at Ouray, Colo., but soon returned to Kentucky where he served in the capacity of state inspector of mines from 1884 to 1897; during the last four years of this latter period he was also curator of the State Geological Department.

During the years 1897-1899, Mr. Norwood was again called into the metal industry, having charge of two gold mine operations in Georgia, while the two years following, 1900-1902, he was mining engineer for the St. Bernard Mining Co. At the end of this period he returned to his old stamping ground in Kentucky, where he was appointed dean of the College of Mines and Metallurgy at the Kentucky State University, with the chair of mining and metallurgy, and also chief state mine inspector. These positions he has successfully occupied from 1902 to date and since 1904 has also been director of the Kentucky Geological Survey.

Charles Joseph Norwood is a member of numerous technical and scientific societies and has received honors and awards from sources that count. He believes that six hours is quite sufficient time for a man to waste in sleeping and hence is not as old as he looks or might appear from the records.

Alabama

Charles H. Nesbitt, chief mine inspector for the State of Alabama, recognized as one of the most progressive and competent officials of the kind in the United States, was born at Jacksonville, Ala., Mar. 6, 1872, and completed his education at the Alabama School of Technology, at Auburn. He followed the vocation of civil engineer until 1890, when he took up the practice of mining engineering at Terre Haute, Indiana.

CHARLES H. NESBITT

Mr. Nesbitt returned to Alabama six years later to pursue his calling with some of the larger corporations, serving in turn the Galloway Coal Co., the Milner Coal & Ry. Co., the Lacey-Buek Iron Co., and the Sloss-Sheffield Steel & Iron Co., until Apr. 20, 1911, when he became chief mine inspector of the State of Alabama by appointment of Governor O'Neal.

Under the régime of Mr. Nesbitt, the mining industry of Alabama is credited with making rapid progress in mine safety. He has thoroughly equipped his office and his force of inspectors with every modern appliance for investigating mine conditions and is administering his office without fear or favor.

Indiana

The Department of Mines and Mining of Indiana, in accordance with an act, approved Mar. 6, 1911, was, on June 1 of that year, reorganized under what is known as the State Bureau of Inspection, which consists of the departments of inspection of (1) buildings, factories and workshops, (2) mines and mining, and (3) boilers. It will be noted that there are three separate departments under one head, though they all work in conjunction with one another.

The chief inspector, the head of the State Bureau of Inspection, and each of the deputy inspectors, the deputy inspector of buildings, factories and workshops, the deputy inspector of mines and mining and the deputy inspector of boilers, are appointed by the governor. The chief inspector may appoint a stenographer, a license clerk and a bookkeeper, and each of the deputy inspectors may appoint a stenographer and three assistant deputy inspectors, and, with the consent of the governor, two additional assistant deputy inspectors may be appointed by each department.

The deputy inspector of factories, mines and boilers, and each of their assistants, must have had at least ten years' practical experience in the line of employment to which they are assigned. The inspector of mines and each of his assistants must also have been residents of the State of Indiana for at least five years immediately preceding their appointment. At the present time, each department is working its full quota of men.

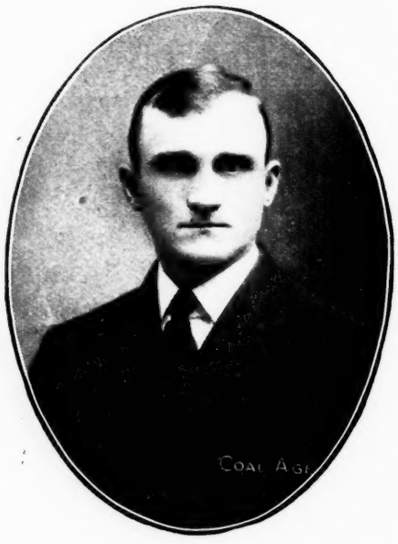
The Present Chief

In 1894, when thirteen years of age, Frank I. Pearce, now chief of the department of mines and mining, left the public schools and commenced work as a miner in what was then known as the Jumbo mine, situated about one mile north of Knightsville, Ind. He worked with his father, Nicholas Pearce, who was at that time in a feeble condition from his long term of years in the mines. They worked together as miners in the mines of Clay and Parke Counties, Indiana, for a number of years, and, finally, on account of his father's health, Frank concluded to try to get along without his assistance, and so secured a position as mule driver.

He continued to work in the mines of Indiana first as a miner, then driver, day hand, cager, timberman and tracklayer, etc., as many others frequently have done, accepting anything that he could get to do. In 1900, Pearce left for Stockett, Mont., and secured a position as laborer, then as a driver and next as helper to a mining engineer with a prospecting party going into Canada. On returning to Montana, he again followed the work of mule driving in the mines.

Worked as a Miner

In 1902, Pearce returned to his home in Brazil, Ind., and continued to work in the mines first as miner, then driver, day man, timberman, tracklayer; in fact, he did any mining work he could get until 1907. During that period he became interested in the study of mining, and by hard work and with what little money he had accumulated, he completed a commercial course in the Brazil Business University, going to school at nights and during those days when the mines were idle, after which he took up the study of shorthand and typewriting. Funds running short and work being unsteady, he gave up this study, to secure employment in the mines of Illinois, though meanwhile he had become quite proficient.



Frank I. Pearce

With the practical knowledge acquired while working in the mines, and the education at the Brazil Business University, he took up the study of mining on returning to Brazil, and, at Terre Haute, 1908, he was examined for mine foreman and fireboss and secured certificates with creditable grades. On Jan. 12, 1909, he entered the examination held for mine inspector and assistants, and from among the eligible list was commissioned assistant deputy inspector of mines, Apr. 15, 1909. This position he continued to fill until the examination for mine inspector and assistants was again held, Jan. 12, 1911.

Chemist Examines Applicants for Mine Inspectorships

As a result of this examination he was placed on the list of eligibles framed by the chemist of the state board of health and presented to the state geologist. This resulted in his appointment as mine inspector of the state. However, before his predecessor's commission had expired, the legislature, which was then in session, passed the bill creating the state bureau of inspection, and placed the appointing of the mine inspector in the hands of the governor, who then reappointed Mr. Pearce.

The personnel of the department of mines and mining is composed of the following: Frank I. Pearce, deputy inspector of mines and mining, Indianapolis; J. M. Hefron, stenographer; assistant deputy inspectors, R. E. Collins, Terre Haute; Joseph Fennell, Linton; John C. Wright, Boonville; Michael Scollard, Brazil, and W. A. Edwards, Clinton.

The mines coming under the jurisdiction of the department of mines and mining, which include those employing ten or more men, are found at the present time in twelve counties. Though the statute does not provide that the state should be divided up into districts, and each inspector assigned a district, each of the assistants at the present time has been assigned a number of mines as close and convenient to his home as is possible. The inspector of mines in Indiana, or his assistants, is required to make a personal inspection of all coal mines in the state at least three times each year. There are, however, a number of mines which frequently require more than three inspections.

Colorado

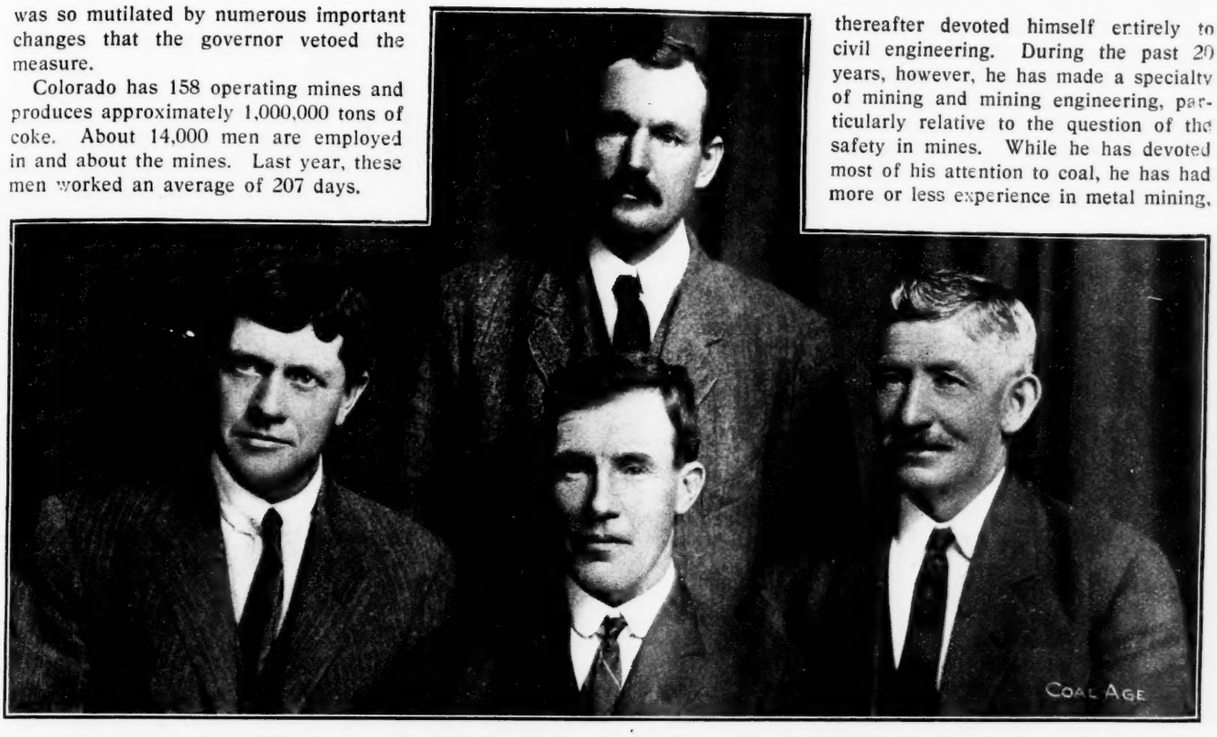
James Dalrymple, State Inspector of Coal Mines for Colorado, was born in Fifeshire, Scotland, in 1863. At the age of twelve, he went to work in the coal mines. In 1882 Mr. Dalrymple immigrated to America, settling in the town of Irwin, Westmoreland Co., Penn., where he followed coal mining until 1885. In the latter year "J. D." went west, locating in Colorado, where he continued at coal mining up to the present time.

The deputy inspectors are Frank M. Oberding, Henry King and James W. Graham.

Last year Colorado produced more than 10,000,000 tons of coal, ranking eighth among the coal producing states. The death rate in 1911 was six per 1000 men employed. It is generally conceded that the mining laws of Colorado are faulty and inadequate. The governor appointed a commission to amend the present statutes, and after working faithfully for five months, a report was prepared and presented for acceptance. The general body of the Commission's report

was so mutilated by numerous important changes that the governor vetoed the measure.

Colorado has 158 operating mines and produces approximately 1,000,000 tons of coke. About 14,000 men are employed in and about the mines. Last year, these men worked an average of 207 days.



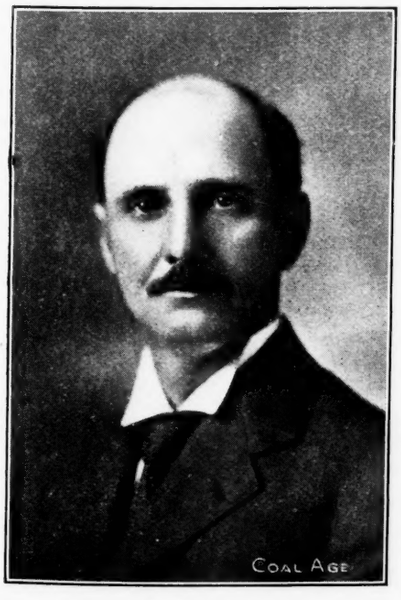
COLORADO'S COAL MINE INSPECTORS—JAMES W. GRAHAM AT LEFT; HENRY P. KING AT RIGHT; F. N. OBERDING STANDING AT REAR AND JAMES DALRYMPLE, CHIEF INSPECTOR, SITTING IN CENTER

Iowa

R. T. Rhys, state mine inspector, district No. 2 comes from a family of miners. His father, grandfather and great grandfather were all coal miners. He was born at Gwaun-Cae-Gurwen, South Wales, July 22, 1867, and attended the public schools of that town until he was 12 years of age, when he was put to work in one of the anthracite mines of that locality.

Mr. Rhys emigrated to this country Mar. 21, 1887, and followed the occupation of mining at Montgomery, Indiana; Sherrodsville, Dell Roy and Long Run, Ohio; and at St. Charles and Saginaw, Michigan. He attended Scio College, Ohio, during the year 1890 and then resumed mining until the fall of 1892. He graduated from the Euclid Avenue Business College, Cleveland, Ohio, in the spring of 1893 and moved to Iowa in the fall of that year where he again resumed mining, and subsequently served in almost every official capacity, in and around the mines of the Lodwick Brothers Coal Co., at Mystic.

Mr. Rhys devoted much of his leisure time to the study of mining and completed a mine foreman's and an engineer's course in the Western Correspondence School of Mining Engineers. He holds a certificate of competency from the State of Iowa as mine foreman and also as mine inspector and was first appointed to his present position Oct. 1, 1906, by Governor A. B. Cummins. He was reappointed by Gov. Cummins in 1908, and has since been twice reappointed by Governor B. F. Carroll. Mr. Rhys makes his home in Ottumwa.

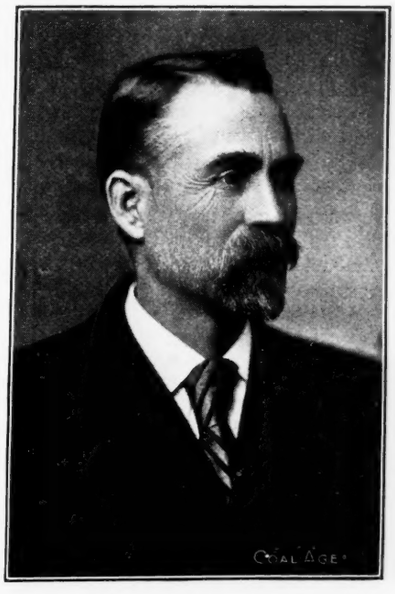


R. T. RHYS

Tennessee

Mr. Sylvester, while a native of New England, has made Tennessee his home for the greater part of the last 25 years. He received an engineering education in the Massachusetts Institute of Technology at Boston, and for several years thereafter devoted himself entirely to civil engineering. During the past 20 years, however, he has made a specialty of mining and mining engineering, particularly relative to the question of the safety in mines. While he has devoted most of his attention to coal, he has had more or less experience in metal mining, having spent some time in the gold section of Colorado and a year or so in Central America as engineer and manager of gold mines.

He was appointed chief mine inspector of Tennessee by Governor Hooper, taking charge of this department in June, 1911. He is ably assisted in his work in the mines by District Inspectors John Rose, of Dayton, and Joseph Richards, of Oliver Springs, both of whom have had a broad mining experience.



GEO. E. SYLVESTER

Kansas

Leon Besson, state mine inspector, was born of French parentage in Scott Haven, Penn., June 7, 1879. At the age of 11, he started to work in the mines at Weir, Kan., and since has seen service in the mines of Illinois, Missouri, Oklahoma, Wyoming, Colorado, Alabama and New Mexico.

He served on two conference committees, which negotiated contracts between the miners and operators of the Southwest coal field, comprising the states of Kansas, Missouri, Oklahoma and Arkansas. Elected to the position of State Secretary of Mine Industries, Feb. 8, 1911, he went into office on July 1, following, being elected to this position for two years.

LEON BESSON

THE MINERS' UNION ENGAGES THE INSPECTOR

The 11,770 miners employed in the State of Kansas, are thoroughly organized as part of the United Mine Workers of America. The office now held by Leon Besson, is practically that of state mine inspector, but his election is entirely different from that held in any state of the Union. An association of miners was created in the year 1898, by an enactment entitled: An act creating a state association of miners, with power to elect a secretary of mining industries, who shall succeed to the power and duties of the state mine inspector. The act provides:

Section 5032—Whenever seven or more miners, whose usual occupation is to mine coal for wages, shall now be organized or shall hereafter organize as a miners' union in any country, city or mining camp in the state, and shall choose a delegate or delegates to the State Association of Miners, as such union may be under this act entitled, such delegate or delegates shall, being duly certified to the secretary of said state association by the presiding officer and secretary of such union, be admitted to and become a member or members of the State Association of Miners until the first Monday in February next following, and until the successor or successors of such delegate or delegates shall have been chosen and admitted; provided, that at any time any such union may recall its delegate or all of its delegates by choosing and certifying a successor or successors.

Each union shall be entitled to one delegate, and to one additional delegate for every fifty, or major fraction of fifty, members of such union; provided, such union shall have been organized three months preceding the then next annual meeting of the said state association, and shall have certified said organization, by its presiding officer and secretary, to the secretary of said state association three months preceding said annual meeting, and during the preceding year, or during such portion thereof as it shall have existed, shall have complied with the requests of the secretary of said state association for statistics and information. Any union may, at its option, authorize a single delegate to cast all the votes to which such union may be entitled; provided, that no delegate shall cast more than five votes.

The law permits the inspector to appoint five deputies: one in each of the following counties: Leavenworth, Osage, Crawford and Cherokee; one deputy at large and a stenographer-clerk for the office. Session Laws of 1909, chapter 79, section 5039, state that the secretary of mine industries of the state of Kansas shall be *ex-officio* inspector of weights, measures and scales used at coal mines, and he or his deputies are thereby empowered, and it shall be his or their duty, to test the scales once every six months.

Regarding this matter, Mr. Besson says: "Scales at the mines should be tested by the State Sealer of Weights and Measures, the same as any other scales. I am called to perform this service at various mines once or twice every month, and this takes me away from the inspection of mines, testing of air and other work which is more important.

"When I first went into office, I found a number of mines where the amount of air required by law was not provided. The law requires that every person must receive 100 cu.ft. of pure air per min. I found that the mine foremen were negligent in not keeping up their return air courses. So it became necessary for me to close down a number of mines till the provisions of the law were complied with. It costs the company more to repair old and neglected air courses, than it would to keep them in good repair, from their first erection."

The coal bed in Kansas averages from 12 in. to 48 in., the greater proportion being worked on the room-and-pillar system, but Osage, Leavenworth and Linn Counties have longwall workings, and their output comprises about one-eighth of the total tonnage extracted in the state.

Missouri

Under the law of Missouri relating to mines and mining, the governor appoints five mine inspectors, with practical experience in mining, two for the coal mines and three for the lead and zinc mines. It is the duty of the inspectors to see to it that every necessary precaution is taken to secure the health and safety of the workmen employed in all the mines in the state. The inspectors have authority to appoint a secretary to have charge of the bureau of mines located at the state capital. The secretary compiles and publishes the annual report of the department.

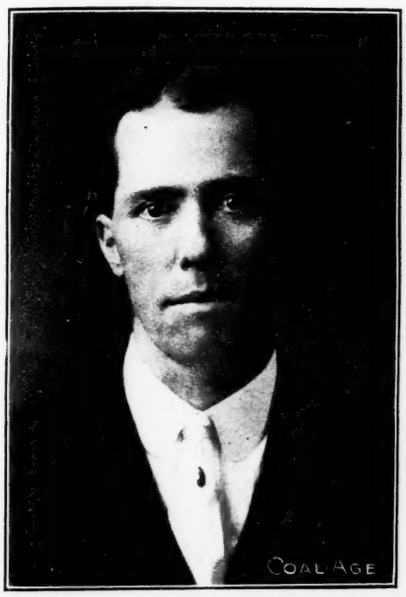
GEO. BARTHOLOMAEUS

The present personnel of the Missouri bureau of mines is as follows: Coal-mine inspectors, Robert Richards, of Bevier, and Michael Gavin, of Lexington; lead and zinc-mine inspectors, I. J. Pirtle, of Fredericktown; George G. Bayless, of Carterville, and William S. Brown, of Joplin; secretary of the bureau, George Bartholomaeus, Jefferson City.

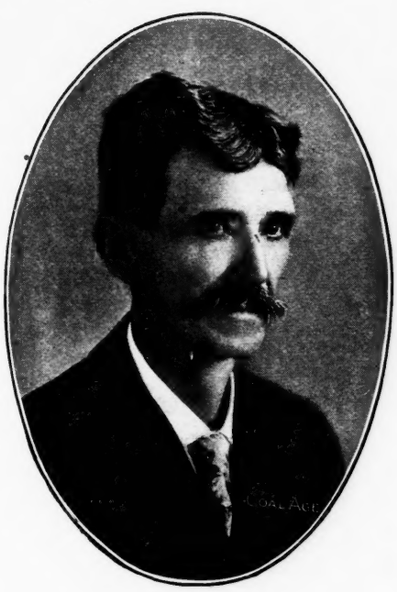
George Bartholomaeus, secretary of the Missouri bureau of mines, at Jefferson City, Missouri, is a native of Virginia, born at Fredericksburg, in 1867. While not a practical miner, his experience has been such as to especially equip him for the duties of his office. Prior to

his appointment as secretary he was engaged in newspaper work, and for four years was state statistician in the office of the secretary of state.

Robert Richards, state coal-mine inspector, was born Feb. 13, 1873, in Spennymoor, Durham County, England. He came to the United States with his parents when eight years old. His father



ROBERT RICHARDS



MICHAEL GAVIN

was a coal miner in England, and followed this vocation in the anthracite fields of Pennsylvania and in the bituminous district of Illinois. Young Richards commenced working in coal mines at the age of 14, and has been connected with coal mines ever since, either as miner, mine superintendent, or as state mine inspector. Mr. Richards assisted in the work of rescue at the ill-fated Cherry mine, in November, 1909. He was appointed state coal mine inspector by Governor Hadley on May 15, 1909, and resides at Bevier, Missouri.

Michael Gavin was born in Ireland, July 31, 1858. He came with his parents to America when less than a year old, and grew to maturity in Lafayette County, Mo. He began work in the mines in 1872, and has worked in or around mines in Missouri, Colorado and Montana ever since. He was appointed coal-mine inspector by Governor H. S. Hadley, of Missouri, on Feb. 15, 1909. His home is in Lexington.

Montana

Joseph Bernard McDermott, state coal-mine inspector of Montana, was born in Kewanee, Ill., June 25, 1860, where his father worked in the mines at that time. In 1873 Joe himself started working in the mine at Bevier, Mo., where the family had moved to in the meantime.

Mr. McDermott started his career at an initial salary of 50c. per day of ten hours, his first employer being one John Cassiday. He arranged for Joe to get one-half the turn from the driver, and in those days the coal was undermined and both ribs cut or sheared before shooting; from 50 to 75 tons of coal was brought down with 1 lb. of powder; banjos or riddles were used and the slack stored in the mines.

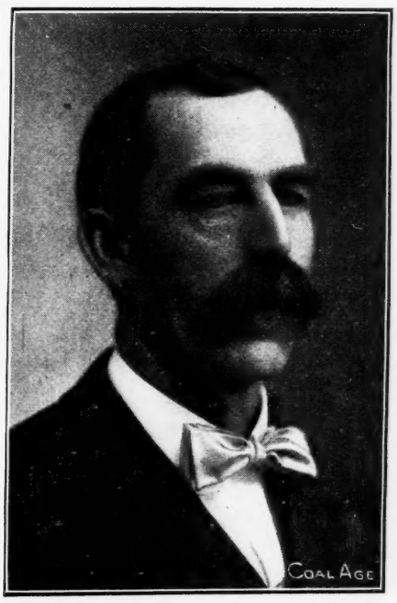
In June, 1878, McDermott went to Carbon, Wyo., where he worked bailing water, driving, etc., for one year. During the six years, 1879 to 1885, he spent in Wyoming, Missouri, Illinois and Savannah, I. T., or as it is now known, Oklahoma, working as a miner. At the age of 25, Joe fell a victim to the white man's burden and married Diana Jones, a native of Morris Run, Penn. We might add in passing that Joe declares this the luckiest episode of his varied career, which statement is amply borne out by a large and happy family of four daughters and one son.

The year of 1891 saw Joe back at Rock Springs, Wyo., where he worked in and around the mines for an old-time schoolmate, at present one of the most successful independent operators in the West, Mr. P. J. Quealy. While engaged at this place, in the capacity of mine foreman, Mr. McDermott met with a serious accident in 1895. A runaway trip had torn out a large number of double timbers, and while cleaning this up and resetting the timbers the ground caved, catching Joe, and for several weeks it was thought the lower part of his body would be paralyzed.

In the year of 1896, McDermott went to Belt, Mont., where he worked around the washing plant, and in the mine as tracklayer, for the Anaconda Copper Mining Co., coal department. As a token of the esteem in which he was held among the men at that place it may be noted that he was elected secretary and treasurer of the Miners' Union, and while serving in that capacity was identified with the construction of the Miners' Union Hall and establishing a library therein. In 1899 he gave up coal mining and located at Helena, Mont., where in the course of time he met and earned the confidence of Governor Toole, who, on Nov. 28, 1905, appointed him state coal-mine inspector. Governor Toole's successor, Edwin L. Norris, justified his predecessor's judgment in McDermott by reappointing him for another four-year term.

ONE OF THE OLD SCHOOL

Mr. McDermott belongs to the old school of practical coal men, and his technical education consists of the best course the International Correspondence School gives, he being a graduate in this



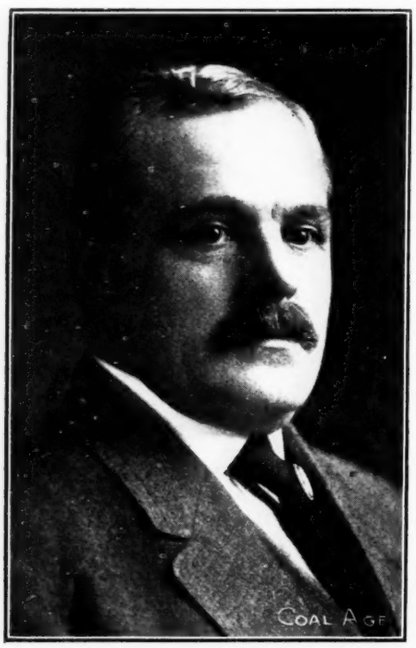
J. B. MCDERMOTT

of which he is justly proud. While an enthusiastic member of a number of lodges and an inveterate smoker, he is a total abstainer from spirituous liquors. Joe's one pet dissipation is a conscientious application to his duties, which permits of shirking no nook or corner in any mine which he might be inspecting.

We might add in passing, that Bevier, Mo., appears to have been a hotbed of mine inspectors. S. M. Moore, Richard S. Thomas and Robert Richards have, or are now, acting in that capacity in Missouri; James B. Reed in Colorado, and Martin Rafter in Arkansas; P. J. Quealy, D. G. Thomas, David M. Elias (who gave up his life in performance of his duties) and William E. Jones have, or are now, serving Wyoming as mine inspectors.

Utah

J. E. Pettit, state mine inspector, was born in 1864, at Newmarket, Suffolk County, England, but it was at Durham that he commenced work in 1879. He came to America in 1886, and was employed by the Union Pacific Coal Co., in various positions at Almy, Rock Springs, and Hanna, Wyo., and also in Utah.



J. E. PETTIT

Pettit, was superintendent of the Grass Creek mines from 1904-1907. He was appointed to his present position in 1907 by Governor John C. Cutler, to fill the unexpired term of Gomer Thomas, who resigned, and he was reappointed in 1909, by Governor Spry, for a four-year term.

Michigan

Andrew Stevenson, chief mine inspector, was born at Coatbridge, Lanarkshire, Scotland, and attended the Gartsherrie School until he was nine years of age, when he went to work in the Caurlincroft mine, which was located in the village of Gartsherrie and owned by the Bairds of that town. The laboring conditions at that period were such that parents were compelled to put their children out to work at an early age and little Andrew was doing a man's work in the mines at the age when boys are now, according to the law, first permitted to start work underground.

SEES THE FIRST SCOTTISH COAL CUTTER AT WORK

Stevenson saw the first coal-cutting machine, or "iron man," which was built in Scotland. It was made by the Bairds, of Gartsherrie, and on trial it proved a failure. But with Scottish doggedness, the Bairds kept on trying until they had a coal-cutting machine, which was probably as good as any at work today.

Stevenson worked in the Gartsherrie pits until he was 18 years of age, then he came to the United States, and worked in Pittston, Luzerne County, Penn., for a short time. Moving from thence to Arnot, Tioga County, Penn., he was married, July 25, 1872. He worked in the Arnot mines until 1875.

While there, he made the acquaintance of John Sirvey, who Stevenson believes, worked harder and tried more earnestly to better the miners' condition while president of the miners' national organization than any other organizer the miners ever had and received less credit than any, for what he did. Stevenson moved from Arnot to La Salle, Ill., in

ANDREW STEVENSON

1875, where he went to work in the LaSalle mines, then owned by Colonel Taylor.

OPENS A MINE BY LONGWALL

He was given full charge of the opening out and developing of the Union Coal Co.'s mine, of which company W. Duncan was president. This shaft was developed by the longwall system. All the coal was taken out clear from the shaft bottom, the development being successfully accomplished without a fatal accident. The work was stopped for only two days while the roof took the first break.

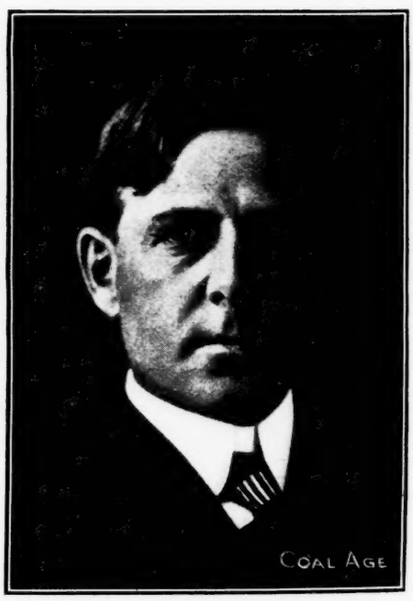
EXTENSIVE EXPERIENCE

Stevenson moved from LaSalle to Buchtel, Athens County, Ohio, in 1881 and worked in the Hocking Valley mines for 18 years. In that period of time, he was mine foreman at the Half-Moon, Furnace Hill and East Hill mines and his experience was extended by periods of foremanship at Glen-Eben and Havely Run, also at Nelsonville in the Hocking Valley. He then occupied the same position at Sand-Run and Lost-Run mines. Finally moving to St. Charles, Saginaw County, Mich., in 1899—he took charge of the Black Pearl mine, St. Charles, under John Simpson, general manager.

He was appointed Coal Mine Inspector of the State of Michigan, May 15, 1902, under the administration of Governor Bliss, and was reappointed by Governor Warner, and again appointed by Charles S. Osborn, the present governor of Michigan.

North Dakota

The inspection of coal mines in the State of North Dakota was inaugurated by the legislative session of 1907. This work was made one of the duties of the state engineer, T. R. Atkinson, and provision was made for employing a mining engineer to have charge of the work of inspection. J. W. Bliss, a graduate of the North Dakota School of Mines, at Grand Forks, which institution pays especial attention to the requirements of lignite mining, was appointed to the posi-



T. R. ATKINSON

tion, which he has occupied since 1908. The statute providing for mining inspection specifies what the report of the state mine inspector is to cover, the inspection of mines being made biennially.

No legislation affecting methods or appliances has been adopted. Mining in North Dakota is as yet but an infant industry, and there is comparatively little danger connected with it. This is due largely to the fact that the majority of

the mines are operating in beds of lignite of such a thickness that a foot or more of roof coal is left. This, due to the slight resilience of the lignite, forms a top that gives ample warning of the condition of the roof. Most of the mines are located on the outcrop, only a few being developed by means of a shaft.

No explosive gases have been found in any of the mines, although blackdamp has been detected in small amounts. The busy season of the year, namely the late fall and early winter months, are, as a rule, very cold, and create such a difference of temperature between the inside and outside of the mine that natural ventilation is usually sufficient.

The present inspection of lignite mines is for the purpose of determining the necessity and character of legislation which may be required as the mining industry increases. In this manner it is anticipated that the conditions to be met in North Dakota may be wisely dealt with and only such laws eventually adopted as will promote the interest of the mine operators and safeguard the lives of the miners.

Qualifications and Appointment of Mine Inspectors in Iowa

By R. T. Rhys*

The manner in which mine inspectors in Iowa are required to qualify, and are appointed to office, has much to commend it.

The executive council of the state, composed of the governor, secretary of state, state auditor and state treasurer, is required to appoint a board of examiners, consisting of two practical miners and two mine operators, all holding certificates of competency as mine foremen, and one mining engineer. Each of these men must have had at least five years' experience in mining, immediately preceding his appointment, and no member of this board may be interested in, or connected with, any school, scheme or plan having for its object the preparation, education, or instruction of persons in the knowledge required of applicants for a certificate of competency as state inspector.

Members of the board are appointed for a term of two years, but any member may be summarily removed from office by the executive council, upon due notice and hearing, for violation of law or other sufficient cause. The board meets biennially at the state capital to examine applicants for the position of mine inspector. The examination consists of oral and written questions in theoretical and practical mining and mine engineering, covering the nature and properties of noxious and poisonous gases found in coal mines, and the different systems of working and ventilation.

*State mine inspector, District No. 2, Ottumwa, Iowa.

Financial Interest in Mining Operations Prohibited

Certificates of competency are issued to those who possess the requisite qualifications and have passed the examination. The governor then appoints three mine inspectors from those receiving certificates of competency and these men hold office for a term of three years. It is required that an inspector shall in no way be interested financially or connected with any mining property; nor may he, either directly or indirectly, act as the agent, officer or representative of any person, firm or corporation engaged in mining within the state. The inspector is required to devote his entire time to the duties of the office.

The governor divides the state into three districts, and assigns one inspector to each district. Each inspector is responsible for the district to which he has been assigned. He has the right to, at all reasonable times, by night or by day, to enter any mine in his district, or any district to which he may be sent by the governor, for the purpose of ascertaining its condition and the manner of its operation. He makes all his reports directly to the governor. The three inspectors maintain a general office in the state house and a complete record is kept there of all inspections, accidents, etc.

A monthly report is made to the governor, and a general report of the condition of the mines, tonnage, accidents, number of employees and other information relative to the coal industry, is published every two years. As the duties of the three inspectors keep them almost constantly in the field, a secretary is elected by them, who has charge of the general correspondence and books in the office. Each inspector receives a salary of $1800 per annum, and actual traveling expenses, not exceeding $750 yearly.

Mine Inspector's Examining Boards in Pennsylvania

There are, at present, four boards of examiners appointed to examine candidates for the office of mine inspector, in the anthracite region of Pennsylvania. Each board, as constituted, is composed of two mining engineers and three miners. The members of the several boards are appointed by the judges of the county courts.

In the bituminous region of the state there is but a single board of examiners, appointed by the governor, as authorized by the Act of May 15, 1893. The present board appointed under this act holds office till Jan., 1913, when a new board will be appointed, under the Act of June 9, 1911.

These examining boards are as follows:

Anthracite Regions

For the County of Lackwanna:

Mining Engineers—Leon Whaite, Scranton; William L. Allen, Peckville.

Miners—John Strong, Peckville; Patrick Flannelly, Carbondale; John J. Bartosch, West Scranton.

For the Counties of Susquehanna, Wayne and Sullivan:

Mining Engineers—T. Ellsworth Davies, Scranton, Lackawanna County, Thomas W. Parry, Scranton, Lackawanna County.

Miners—Lewis Jones, Forest City, Susquenhanna County, John W. Jones, Forest City, Susquehanna County, William Mason, Forest City, Susquehanna County.

For the Counties of Luzerne and Carbon:

Mining Engineers—Frederick E. Zerbey, Kingston, Luzerne County, Samuel D. Warriner, Wilkes-Barre, Luzerne County.

Miners—John Gilhooley, Avoca, Luzerne County, James Harkins, Drifton, Luzerne County. James Llewellyn, Beaver Meadow, Carbon County.

For the Counties of Schuylkill, Northumberland, Columbia and Dauphin:

Mining Engineers—John H. Strauch, Pottsville, Schuylkill County, John H. Pollard, Mahanoy City, Schuylkill County.

Miners—David J. Davis, Pottsville, Schuylkill County. James Bache, Locust Gap, Northumberland County, William Grove, Tower City, Schuylkill County.

Bituminous Region

President—George S. Baton, Mining Engineer, Keystone Building, Pittsburgh, Allegheny County.

Secretary—Charles B. Maxwell, Morrisdale Mines, Clearfield County.

George E. Gay, Mining Engineer, Uniontown, Fayette County.

John W. Donaldson, Jeannette, Westmoreland County.

John Reed, Reynoldsville, Jefferson County.

Advantages of Central Station

Some of the advantages of centrally located high-tension transmission stations for electrically operated mines are: Reduction in number of employees needed at stations; the capacity for one central station may be less than for several small plants; such supplies as fuel and water are not needed at substations; less copper is required; substations do not call for expensive foundations; no difficulty in maintaining a good working voltage; distant points are as well supplied as nearby places; substations require little attention.

Coal Mine Accidents in W. Va.

By David Victor*

The accidents from mine cars are due largely to the lack of clearance between the sideboards and the rib. More than half the coal in West Virginia was extracted from mines where no fatalities occurred. A well disciplined mine attracts good men and is likely to have an adequate supply.

*Chief mine inspector, Consolidation Coal Co., Fairmont, W. Va.

Note—Abstract of a paper read before the West Virginia Coal Mining Institute, June 7, 1912, at Charleston, W. Va.

The result of the combined efforts of the West Virginia State Department of Mines and the operators to reduce the number of accidents, fatal and otherwise, has certainly been encouraging. The statistics of the department for the year 1910 show that there was only one man killed by gas and none by dust explosions; yet there were 320 fatally injured in the mines of the state, the deaths being classified as follows:

ALL FATALITIES, WEST VIRGINIA COAL MINES

By falls of roof and coal	215
By mine cars	64
By explosions	1
All other causes	40
Total	320

The accidents from mine cars have been classified in a limited number of West Virginia mines as follows:

ACCIDENTS FROM MINE CARS, SELECTED MINES

Lack of	Percentage
Clearance	28
Discipline	20
Track and car maintenance	20
Total	68

At the same group of mines 51 persons were injured by falls of roof and coal, 15 of which accidents were fatal.* Classified as to causes, they are as follows:

ACCIDENTS FROM ROOF FALLS, SELECTED MINES

	Percentage
Unavoidable	11
From disobedience to orders	11
From indifference or lack of attention	29
Total	51

While I am aware that all accidents around the mines cannot be prevented, I am of the opinion that if all parties concerned could see the importance of eliminating these accidents as plainly as they do that of the prevention of explosions, 75 per cent. of the accidents we now sustain could be eliminated. In support of this I shall quote from Chief Inspector John Laing's report to the governor of West Virginia for the year 1910. Mr. Laing says: "All the 307 fatalities which occurred inside the mines of West Virginia during the year 1910 happened at 216 mines, which employed 25,554 persons and produced 24,602,612 tons of coal, while at all other mines there were produced 28,321,096 tons without the loss of a single life."

Fatalities from Mine Cars

There is little need for 28 per cent. of all the accidents from mine cars to arise from lack of clearance. Drive the headings straight. This is not a difficult matter when it is given the proper attention. If the top is bad, clearance along one side should invariably be provided and kept in as good condition as the track itself. When the top will permit it, clearance should be maintained on both sides and kept in good, clean condition, so that it is always ready to provide the protection for which it is intended. The next requirement is to lay the track straight and in the right position to give the desired clearance room. All track should be well laid and constructed of good materials, supported by a good road bed. The fish-plates should be properly bolted and the spaces between ties well filled so that the track is kept in position. Then good ditches should be maintained, for without good drainage good tracks are almost impossible.

The Car with a Twist

The mine cars should receive the next attention. They are the most abused equipment around the mines. Instead of being run with badly worn-out wheels and bent axles, there should be a shop at each mine where all mine cars needing repairs can be taken, turned over and the necessary repairs made in the proper manner. I say "proper manner" because on my trips through the different coal regions, I seldom came across a shop which was equipped with appliances to repair a car properly. There are many repair shops today which do not even have a template for indicating the proper gage to be followed in setting the wheels on the axles. Seldom does a mine car have the square put on it after it is once built; it usually travels until the bad parts cause a dangerous wreck and demolish the car, so that it has to be replaced by a new one.

How Bad Discipline Drives Away Men

With reference to a lack of discipline some of our mine officials will tell you that on account of the scarcity of miners and mine laborers it is impossible to enforce rules or discipline successfully; yet my experience teaches me that today the man who maintains good discipline around his mine is better supplied with miners than the man who does not regulate his mine so strictly, because when men are allowed to break the mine rules, the first result is bad timbering and bad tracks. These afterwards become dangerous places and the haulage facilities are impaired. These untoward conditions result in a reduction of the miner's daily earnings, and consequently he has a desire to go where he can get a better place and make more wages.

The successful man handles his men in such manner that he can keep them all in good places. He keeps everything in shape to insure each man a good day's wage when he works. He sees to it that all his employees carry out instructions with reference to timbering, laying track and doing anything which may tend toward keeping the mine safe. If this is done the only man he loses is the one who did not want to do his work in the right manner, and the operation is better off without him and the company will have no trouble in filling his place with a good man, provided that the room or heading is left in good condition.

Plenty of Men at Well Ordered Mine

I have often heard men remark that they would rather work at another mine, but conditions of working places and haulage roads were so bad that they could not make wages, so they were compelled to work elsewhere; and this same principle holds good throughout the mine, for it is easier to keep drivers and trackmen where mine tracks, wiring and timbering are kept in safe condition, which can only be done by maintaining the best of discipline.

One feature of the danger from electrical machinery is the following: Most breast machines are made without any brake. The man in charge depends on holding the machine where the grade is not too heavy, and when coming to a steep grade it is necessary to sprag the truck, causing danger to the operator, who sets the sprags. If he fails and the machine runs away, a driver or any person who happens to be in the way of the runaway machine may be caught. Very few machine operators want to protect themselves and others, by using bit-boards or some other means of covering the bits in the cutter-head end. In case the machine comes in contact with or collides with a horse or man, liability to serious injury will be considerably reduced, if the proper precautions have been taken.

Thin concrete slabs constructed on wire netting placed between the flanges of the I-beams used as steel supports make an excellent form of lagging as they are easily removed when broken

*The writer does not make any reference to 83 other accidents from the same cause.—Ed.

Quality and Quantity of Mine Air

By Karl F. Schoew*

This article points out that coal dust is precipitated and carbon dioxide dissolved by moist air, and the air thereby purified. Air need not be fully saturated to part with its moisture. Brattice cloth absorbs water at 94 per cent. of humidity, and at 96 per cent. is rendered wet to the touch.

Note—Abstract of a paper read before the West Virginia Coal Mining Institute, June 6, 1912, at Charleston, W. Va.

*Mine inspector, first inspection district West Virginia, Fairmont, W. Va.

Eminent mining authorities, such as Haldane, Heise and Herbst, state that the breathing of fire-damp, when it is present in such small quantities that it will not explode, is not injurious to the health of mine workers. Although a man may breathe an explosive mixture, no injurious effects will be noticed on returning to fresh air.

Fumes From Explosives

Considerable progress has been made during the last few years in bettering the quality of explosives used in mines. However, there is room for improvement, for one pound of explosive powder used in blasting coal will produce from two to four cubic feet of explosive gas. It has been determined by chemical tests that if a mine is ventilated, as required by the West Virginia mining law, the additional amount of explosive gas produced by the shooting will not have a noticeable effect on the whole percentage of explosive gas leaving by the main return. But, as the fumes contain the poisonous gas, carbon monoxide, and also carbon dioxide, methane, etc., it can readily be seen that a miner's health will suffer if a sufficient amount of air is not distributed to the working face.

Solid Impurities in Mine Air

That air issuing from a mine contains solid matter enough to make it visible, cannot be denied, unless the dust particles in the air have been washed out by the moisture carried in a well-saturated current. Some mines are apt to be more dusty than others. However, if blowing fans are used for ventilating, and a sufficient amount of steam is injected into the intake air, the floating dust particles at any place in the mines will readily fall to the floor, due to the thorough washing of the atmosphere when the dew point is reached. Free the air of this dust by washing it, and you will thereby protect the health and enhance the efficiency of the coal digger.

Ventilation-Quantity, Temperature and Moisture

From 0.5 to 1 per cent. of methane is permitted in the return air from splits and in the main returns of German mines but only where locked safety lamps and permissible explosives are used exclusively. Considering that we must employ a large percentage of foreign laborers, many of whom cannot understand the English language and who have a limited knowledge, if any, of the dangers of firedamp and blackdamp. I believe that the maximum percentage should be: Methane 0.6 per cent. and carbon dioxide 0.3 per cent. in all returns, when locked safety lamps and permissible explosives are used exclusively. In mines where open lights and black blasting powder are being used, the maximum percentages of both methane and carbon dioxide should be 0.3 per cent., in all returns.

In actual practice I have found that 1.5 per cent. to 2 per cent. of methane is explosive when mixed with dry coal dust floating in the atmosphere, the observations being taken in a mine at a temperature of 47 deg. F.

Professor Heise observed the minimum explosive temperature of methane to be 1112 deg. to 1292 deg. F., the maximum temperature being 4802 deg. F. The most violent explosions occurred when air contained 9.5 per cent. of methane, oxygen being present in sufficient quantity to allow complete combustion. It has been observed that the quantity of firedamp in gaseous mines increases in many cases nearly proportionately to the extension of excavations, provided there are no outlets to the surface for the gas in sections which are being robbed.

What is a Gaseous Mine?

The question has often been asked: "What is a gaseous mine?" Any mine is gaseous which liberates explosive gas; whether that gas will affect a safety lamp or is only revealed by a chemical analysis. I would like to suggest the following as a mode of determining whether a mine is really gaseous. Shut down the fan and close the intake and return airways for a period of 24 hours; if the chemical tests of the air in the mine do not show methane to be in the atmosphere in excess of 1 per cent., then the mine is liberating firedamp in such small quantities that the operator should not be compelled to employ a fire-boss or bosses, provided that similar tests are made monthly and that the fan is of approved size to supply ample ventilation and is kept in operation day and night to insure a safe and good quality of air.

Dangers of Tornado Ventilation

There is no advantage in excessive quantities and rapid currents of air. Some mines are liberating explosive gases in such large quantities that we cannot dilute them with fresh air to such an extent that they cannot be detected by chemical tests. Moreover, during the cold season of the year, such excessive quantities of air could not practically be heated by steam, so as to be capable of carrying sufficient moisture into the mine to keep the coal dust wet. The larger the current of unsaturated air traveling through a mine, the faster the dust is dried up.

Gas Which Gives no Sign

In the mines of our state from 0 to 600 cu.ft. of methane is liberated per minute. As there is an ever present danger that natural gas will escape from gas wells into the mines, and that gas blowers will be encountered in the advanced working places, chemical tests of the mine air should be made at least once a month in every gaseous mine to ascertain whether there is ample ventilation provided to dilute what is being liberated. In non-gaseous mines chemical tests should be made at least every three months. The State mining department should keep records of the results of all these tests as made in both gaseous and non-gaseous mines.

Chemical tests of mine air would prove to be an eye-opener to many operators. Although the mine and fan may have been idle for a day, the intakes and returns of the mine closed and no firedamp detected with a safety lamp or with an open light, this by no means establishes the fact that the mine is entirely free of explosive gas; for as much as one per cent. of methane would not be detected by a fire-boss, and it would not burn if an open light were put into the mixture.

Temperature and Moisture

From a standpoint of economy, safety and promotion of health, air entering live working places and gobs should by all means be adjusted to natural mine temperature, which, in our state, is about 57 deg. to 60 deg. F., and should contain a minimum percentage of 94 per cent. humidity. Brattice cloth only be-

gins to show slight moisture at 94 per cent. of air saturation at the natural mine temperature, while at about 96 per cent. humidity it is thoroughly wet to the touch. Coal dust exposed to 90 per cent. humidity at mine temperature will appear dry to the observer.

A few hygrometers placed at the mouth of inlets to butt entries will prove beneficial. They should be read by the fire-bosses and the reading reported twice weekly. If necessary, additional steam could then be passed into the air. If the mine temperature be kept at 57 deg. to 60 deg. F., and 94 per cent. to 100 per cent. saturated, considerable expense from roof falls will be obviated, because these in many cases are due to sudden changes in mine temperature. It would also prevent mine fires, as all combustible material would be kept thoroughly wet. The effect of over-heated air currents in mines, as we all know, is to reduce the powers of body and mind, especially when concurrently the air is saturated with moisture. At a certain temperature there is a decided change in the human body.

Fifty-five Degrees is the Healthy Temperature

On all Fahrenheit thermometers 55 deg. is marked as temperate, which is nearly the natural temperature of the West Virginia mines. Above 55 deg. we require little warmth, and this is supplied by a little exercise. When the air is colder, it is probable that the conducting power is too great for the amount of heat developed. At any rate, the point in question is one to be noted, and it appears extremely reasonable that the ability to labor will be diminished as the heat varies much above or much below 55 deg. F. The aim should be to maintain the natural mine temperature all the time. Whenever the temperature in a mine is left unadjusted, the necessity for adjustment is felt.

The human body demands warmth above all things, and it is the very first demand, as no functions can be satisfied without it. No doubt a person may live for days, perhaps years in badly ventilated places, with more or less discomfort or danger to health. The danger of cold, besides many others, confronts mine workers in mines where during the cold season exhaust fans are used, so that the intake cannot be heated. The great instinct of man is to keep warm. Adjusted mine air, be it at full saturation, or near that point, feels comfortable, and is a great agent in the purification of the atmosphere. Coal dust and solid particles of powder fumes are quickly washed out of the air. Thus the mine is speedily made free of this menace.

DEPARTMENT OF MINES
State of West Virginia

Karl F. Schoew
First District Mine Inspector

Date of Observations.....191....

REPORT OF MINE AIR

Name of Mine..... County.....
Belonging to..... Address.....
Weather.....Outside temp.....F. Fan W. Gage.....in. Barometer.....in.

Remarks	Area	Vel.	Cu. Ft.	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Gal. per 1000 Cu.Ft.	$\frac{CH_4}{\%}$	$\frac{CH_4}{Cu.Ft}$	$\frac{CO_2}{\%}$	$\frac{CO_2}{Cu.Ft.}$	Lab. No.
Main intake													
Main return													
Intake													
Return													
Intake													
Return													

Is this mine worked by shaft?.....Drift?.....or slope?.....
Maximum percentage of Methane.....0.6% permissible in any current where locked safety lamps and permissible explosives are being used.
Maximum percentage of Methane.....0.3% permissible in any current where open lights and black powder are being used.
Methane in Main Return Air.....Per cent. total methane per min.....cu.ft.
Air required per minute to dilute methane and carbon dioxide properly.....cu.ft.
Split No.....
Rev. of fan per min.....
Method of humidifying.....
Is humidity introduced in day time?.....and at night?.....
Watering entering mine with intake air.....gallons per minute.....in 24 hr.
Water leaving mine with return air.....gallons per min.....in 24 hr.
Gain of water.....gallons in 24 hr.
Loss of water.....gallons in 24 hr.
Is the roof dry or wet?.....Fan blowing?.....or exhausting?.....
Mine working?.....Or idle?.....

Fairmont.....191..

Signed.....
Mine Inspector 1st District.

Blackdamp can readily be dislodged in live workings and gobs by ventilating with air which has been adjusted, and is, therefore, fully or nearly saturated. Each gallon of moisture introduced by this means is capable of absorbing equal volumes of carbon dioxide.

Where Moisture is Harmful

Moisture does cause an increase in fatality in some countries. It does this, if there is no wind to agitate the humid air, and no rainfalls to wash it clean. When we are exposed to fog and humidity, with no wind to agitate them and no rain to wash the impurities out, it is not hard to understand that the atmosphere is harmful. But these conditions do not exist in our mines. The air is moving, and although it may be fully saturated, as soon as the dew point is reached, the moisture drops like rain, and cleanses the atmosphere.

I have observed during my experience as a mine inspector that properly adjusted mine air, although fully saturated with moisture, has no injurious effect upon miners. Fresh air is a good investment, whether it be in an office or in the mines. Without it the most energetic lose force and cannot do a full day's work. A miner cannot develop his utmost power without fresh air, any more than can the fire under a boiler yield the utmost heat when deprived of the necessary amount of good air.

I include in this paper a blank form of mine-air report, which if used by all operators would make coal mining more profitable and less hazardous.

The Early Mine Inspectors

The evolution of the principle of coal-mine inspection in Great Britain has been one of the wonders of the last 60 to 70 years. There was really no inspection of the mines until 1850 when Matthias Quinn, Joseph Dickinson, Charles Morton and Kenyon Blackwell were appointed under the Mines Inspection Act.

They labored in stirring times. Viewed with suspicion by the coal owner, the management and even the miner, they had on occasion, some unpleasant tasks to perform. However, they worked for the common good and eventually broke through the barriers of opposition.

When Government inspection was first suggested, it was objected to on the grounds that it would interfere with the rights and privileges of the individual, and one noble lord went so far as to voice the veiled threat, "You may go down the pit in whatever way you choose, and when you are down you may remain there." Times change, for today inspectors have the approval of the British public and are welcomed at the collieries.

Current Coal Literature

The Best Thought Culled from Contemporary Technical Journals, Domestic and Foreign

An Acetylene Safety Lamp*

The chief engineer of the Seville district in Spain, submitted to the Firedamp Commission, in 1910, an acetylene safety lamp invented by Alexander Tombelaine. The report of Enrique Hauser, Secretary of the Commission, presented Nov. 1911, has been published in full in the "Revista Minera" of Madrid and from it this abstract is made.

Description of the Lamp

The lamp is comprised of three main parts: a cylindrical reservoir *A* for the water, an inside receptacle *B* for the carbide and an upper part *C*.

The reservoir *A* is provided at its base with a thumb screw *a* and at the top with holes *b*. The reservoir is filled with water by immersing it, the water entering by these holes.

The carbide receptacle *B* has at the top a threaded neck *c* hermetically fitting with the cover *d*, and at the bottom a felt washer *e* and a small conical valve *f* with a spring *g*, to regulate the entrance of water. The screw *a* moves the needle rod *h* regulating the flow of gas through the burner and also the valve *f*.

The upper part *C* of the lamp comprises two safety gauzes *i* and *j*, a steel shield *k* and a ring *l* at the bottom for feeding air. This ring carries baffle plates *m n* and *o* to lessen the effect of strong currents of air on the flame. The inner gauze is extended down (see *p*) as far as the middle of the glass chimney (*q*) to prevent breakage of the glass by contact with a flame enlarged by a possible defect in the burner.

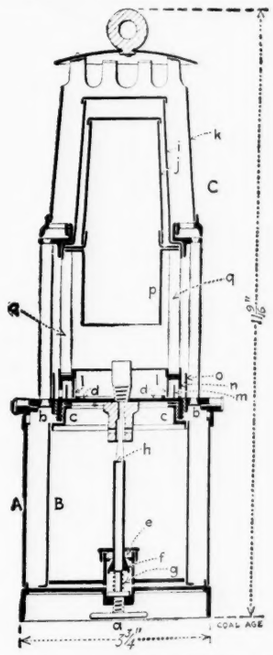
Closing of Lamp

There is a special system of closure by a seal of fusible metal. The upper edge of the reservoir *A* contains a small depression to hold this metal. The columns of the upper part of the lamp are fixed on a ring having holes near the circumference. We screw the upper part of the lamp on the lower until the glass chimney is fixed. It is easy to make a hole in this part coincide with the depression to which I have referred.

Into this we then pour a little melted Darcet metal, which takes hold in the socket without sticking to it and thus prevents the lamp being opened by the workmen. To open it in the lamp room a little cylinder heated to 257 deg. F., is introduced into the upper hole. This melts the metal and permits the breakage of the seal.

Passage of the Flame through the Wire Gauze

The ability of a flame to pass through a gauze is proportional to the rapidity with which its constituent gases ignite and with the lowness of the temperature at which their ignition takes place. But the temperature of ignition of acetylene



THE TOMBELAINE ACETYLENE SAFETY LAMP

(842 deg. F.) is less than that of the other common combustible gases. Hydrogen burns at 1022 deg. F., while carbon monoxide and methane ignite at 1202 deg. F. Furthermore acetylene is more quickly ignited than methane. Because it ignites speedily and at a low temperature, its flame is of a nature favorable to its passage through a lamp gauze.

After a lamp had burned normally for one-half hour, by the use of a Le Chatelier pyrometer I took the temperature of the flat top of the outside gauze. This was 392 deg. F. while that of the flat top of the inside gauze was 644 deg. F. The latter was, at that moment, quickly lowered upon the flame which passed through it several times, raising its temperature to 797 deg. F. A similar experiment was made with the same gauze cold. It became coated with soot and the flame failed to pass through it.

There is a risk that the flame may be suddenly elongated as a result of shocks or of a too sudden manipulation of the screw which regulates the light, or owing perhaps to leakage through defective joints in the metal of the lamp. The felt diaphragm was designed by the inventor to overcome the second possibility and is intended to prevent abnormal flaming with all valves open. I would recommend decreasing the consumption of the burner, adding a third safety gauze and reducing the air-admission apertures. The last mentioned improvement would lessen the draft. The flame would not then be able to elongate without smoking and it has been seen that the deposit of soot is an obstacle to its passage.

Leakages of Acetylene

Leakages of acetylene are to be apprehended by reason of the little difference between the densities of air and acetylene (that of the latter being 0.92). This promotes their mixture and the low limit of inflammability of acetylene (2.8 per cent.), which is about half that of fire-damp, is another reason for the necessity of obtaining a tight lamp. The burning of escaping gas might produce large caps and deceive the observer as to the nature of the atmosphere.

These leaks, which are not to be expected in the construction of well made lamps, may occur through a lack of tightness in the joint of the cover of the carbide receptacle, especially at the leather-ring closure of the apertures for filling the reservoir with water. I believe the remedy to lie in a careful inspection of the lamp and a modification of the apertures *b*. These, enlarged, might be provided with flat tubes descending along the outer wall to the base of the reservoir, so that the escape of gas would occur as distantly as possible from the point where air is admitted.

Extinction of the Flame

If the flame be of normal size, it is not extinguished by shocks and therefore has a marked advantage over oil or benzine lamps. The flames of oil and benzine are extinguished by residual atmospheres of almost identical composition. The light expires when the oxygen is equally exhausted and when like proportions of nitrogen and carbon dioxide are present. But acetylene flames expire in a very different atmosphere and the following are

*Translated by E. P. Buffet for "Coal Age."

the results of some experiments by Mining Assessor Beyling:

COMPOSITION OF EXTINGUISHING ATMOSPHERES

Illuminant	Oxygen	Carbon dioxide	Nitrogen
Benzine	15.9	3.1	81.0
Acetylene	11.9	7.0	81.1

If the acetylene lamp offers the advantage of a greater resistance in a residual atmosphere, it presents at the same time the disadvantage of not giving so early a warning of the presence of irrespirable gases.

For a normal charge of 3.53 oz. of carbide and 5.29 oz. of water, the lamp is able to furnish 1.06 cu.ft. of gas; that is, for ten hours' service 0.106 cu.ft. per hour. My photometric experiments with a Joly photometer show a lighting capacity of 30.6 candle-hours; that is, a mean power of 3.06 candles for 10 hours. This power is much greater than that of benzine safety lamps, which rarely give as much as one Hefner candle* (0.97).

*A Hefner candle is nine-tenths of an International candle.—Editor.

This advantage is important, for the best remedy against roof falls and most underground accidents lies in a good lighting system.

Weight of the Tombelaine Lamp

When empty the lamp weighs 3.53 lb. and when newly filled 3.97 lb. I give some comparative figures relative to the principle types of lamps used in Spain:

Weights of Safety Lamps

	Lb.
Oil lamp without shield, filled	2.57
Marsaut oil lamp with shield, filled	3.01
Benzine lamp with shield and relighter, filled	4.41
Draeger electric lamp, of aluminum (1911 type, 1½ candle for rescue stations)	3.20

Caps in Gas

The Tombelaine lamp is well adapted to testing for firedamp when the flame is properly reduced. I have carried out some comparative tests with an unshielded benzine lamp using a round wick. The experiments were conducted in a Clowes chamber of 3.53 cu.ft. capacity. Starting each time with the flame reduced to a simple brilliant point, the results were as follows:

CAPS OF ACETYLENE AND BENZINE LAMPS

Methane Percentage	Height of cap, inches	
	Acetylene	Benzine
0.81	Only the base of the cap is visible	
1.62	0.20	0.40
2.35	0.24	0.59
3.16	0.47	1.18 to 1.38
4.40	1.77	2.36 to 2.76

The cap of the acetylene flame, though smaller, is less diffused and more clearly defined than that of benzine. One per cent. of the gas is observed without difficulty. It is desirable, however, in order to avoid all confusion with a cap which might be caused by acetylene, to reduce the flame gradually until it ceases to quiver.

Conclusion

Despite the few disadvantages mentioned, the Tombelaine lamp must not be regarded as wholly impracticable. It has some strong points in its favor, viz: Resistance to extinction, a lighting power three times as great as that of ordinary lamps, which is obtained without reducing the opportunity these afford of observing caps in gassy atmospheres.

Jamage Mine Fire and Explosion

Special Correspondence

Mine fires in England have formerly occurred mostly in nongaseous mines. The attempt to close in a fire in the gassy Jamage workings caused an explosion. The chief inspector's report explains why it took 27 hours for the construction of three stoppings in passages only eight to twelve feet wide.

At the Jamage shaft of the Bignall Hill colliery, an explosion occured on Nov. 25, 1911, whereby six lives were lost and an equal number of persons received injuries. The Home Office inquiry into the accident was conducted by the Chief Mine Inspector R. A. S. Redmayne.

The Bignall Hill colliery is situated in the county of Stafford and consists of three groups of workings, namely, the Jamage Main, the Jamage and the Rookery mines. The workings in four seams are connected to the Jamage shafts, the various beds being at the following depths below the surface:—Seven Foot 225-ft., Eight Foot 435-ft., Bullhurst 750-ft. and the Ten Foot 840-ft. The position of three of these seams is shown in Fig. 1, which represents a section at the Jamage shafts.

The Coal Beds

The explosion took place in the Bullhurst seam, two sections of which are shown in Fig. 2. The thickness of this seam in the Jamage mine varies from 6 ft. to 20-ft. In some places the seam is flat and at others it pitches at 60 degrees.

Fig. 3 is a vertical section of the two Banbury splits and the Bullhurst seam taken along *A-B*, in Fig. 4. The latter is divided by bands of shale (dirt and "hussle") into four layers of coal, namely, "bottoms," the most important part of the seam, and that in which the roads are driven, "middles," "little tops," and "big tops." The intervening bands of shale also vary in point of thickness and in the section illustrated in the figure the "hussle" is shown as being only three inches in thickness, though in other parts of the mines it is thicker, sometimes attaining to five feet.

Mining Methods

The method of working practiced, is a modification of the "bord and pillar" system, and consists in driving roads in the bottom coal to form roughly rectangular pillars of various dimensions. These roads are driven about eight feet wide, but they frequently widen eventually to twelve feet owing to the coal crushing off the sides. The coal in these roads or openings is taken down up to the bottom of the little tops, as it is found that this coal usually forms a good roof. The pillars are worked on the retreating system, slice after slice being taken off the inbye end. Each slice is 36-ft. wide. When a slice has been taken off, the timber supporting the roof is systematically withdrawn row by row, and the hussle and little tops are allowed to fall, or are taken down and as much of the coal is recovered as is possible, supports being set at the same time up to the big tops. Lastly this upper stratum is also taken down and loaded into cars.

Ventilation

The inspector considers that the method of ventilating was not satisfactory. The Jamage mine was ventilated by a Waddle fan placed at the top of the upcast, but a small portion of the workings was ventilated by leakage through the waste portion of the Eight Foot seam, the air from the Rookery entering by the intake shaft. Moreover some of the return air from the Rookery mine went through the Jamage upcast shaft. The total quantity of air passing into the Jamage mines was 74,126-cu.ft. per minute consisting of 49,960-cu.ft. from the Jamage downcast, 3520-cu.ft. which entered from the Rookery mines and 26,640-cu.ft. which was drawn from the Jamage Main mine. The volume of air passing up the upcast shaft measured 73,552-cu.ft. This result is discrepant, for instead of having the

lesser volume, the return air should show an excess on account of expansion and added gases from the mines.

Fire Occurred in Working Pillar

In the No. 1 Bullhurst district where the fire originated a pillar of coal was being drawn back. The retreat in pillar drawing was toward the dip, so that the fallen roof lay to the rise. There were five roads leading to the place, two of which had been stopped off. In the other three roads stoppings had been partially constructed, leaving just sufficient opening to allow of the passage of the horses, cars and workmen. The reason that three roads were left open in the present instance was in order that one might act as an intake airway, the middle one as a haulage road and the third as a return airway.

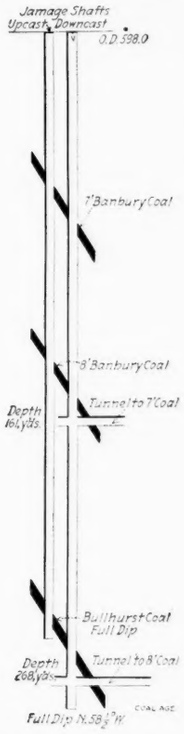


Fig. 1. Shafts of Bignall Hill Colliery

At the inquiry, 22 witnesses were examined and among Mr. Redmayne's conclusions the following may be noted: The explosion was purely a gas explosion and was caused by a mixture of firedamp and air which became ignited by a fire in the gob. Had it not been for the fact that the stoppings shutting off the fire broke the force of the explosion, the coal dust in the roads would probably have carried the explosion out to the shaft, as was in all probability the case with an explosion which occurred later. Mr. Redmayne thinks the fire had been smoldering for some time and that the stopping off of the affected area allowed the firedamp to accumulate thus producing an explosive mixture.

Where Stoppings Should Have Been Placed

The inspector suggested that the stoppings should have been erected nearer to the goaf, but even had this been done the advantages which would have been gained thereby are doubtful. On the one hand it might have brought about the conditions causing the explosion earlier but on the other, it might have limited its force or prevented its occurrence. On one point he is quite clear that too much time was expended in building off the affected area. It would have been wise to have built the brick stopping first, withdrawing the men as soon as that was done, not permitting them to return perhaps until the next day, provided no explosion occurred meantime. The mine management could then have strengthened the temporary stoppings by building dirt packs against their outbye faces.

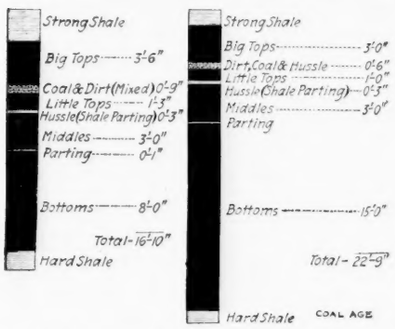


Fig. 2. Average Section and Section at Site of Fire

Inspector Johnston stated the problem thus: "Twenty-seven long hours were spent in the building of dirt packs, whereas brick walls could have been built in three. After they were built, 24 hours would still have been available for erecting dirt packs to reinforce them. The walls and packs combined would have been quite as strong as a dirt pack in the building of which 27 hours of labor had been expended, but in this event the air would have been sealed off wholly or partly many hours sooner than it could possibly have been by the method actually adopted.

Mine Fires Should be Fore-warded

There was a want of method in laying out the Jamage Mine, but the present manager is not held responsible for this, as it was laid out before he took charge. The systematic projection presented in evidence by F. Rigby is commended as a means of preventing gob fires in North Staffordshire. The principles embodied are:

1. To have as few roads as possible into a given district.
2. So to control the ventilation that as little air as possible may traverse the falls, or as Mr. Rigby expressed it "to keep control of the ventilation and confine it to those places where it is really required, along the working faces but to prevent absolutely, if possible, a circulation of air through the goaf."

Sealing, Stowing and Flushing Goaf

Mr. Rigby has carried out these principles for 25 years with success, working long wall wherever possible, and keeping control of the ventilation by means of the most perfect packs he could erect. Preparatory stoppings were put into the main roads, so that if any trouble arose from gob fires these stoppings were ready for speedy closing.

When it is possible to pack the wastes tightly, Inspector Redmayne, considers longwall the best preventative of gob fires. If the Bullhurst seam in the Jamage mine had been worked by this method, the flushing system of packing the abandoned workings could have been adopted with success.

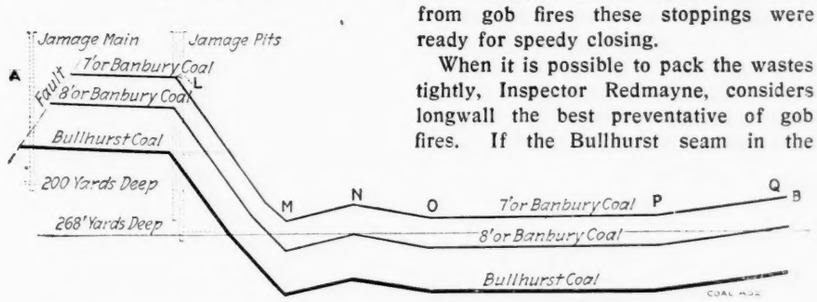


Fig. 3. Section Along A-B on Plan, Showing Grades of Banbury and Bullhurst Seams

The method as practiced at the Lens colliery of the Pas-de-Calais coalfield is held to be the "most perfect of all forms of stowage, inasmuch as it permits a closer packing of the goaf than any other method." The advantages include: (a) A saving in timber; (b) the possibility of maintaining a longer length of face, hence, less cost of upkeep of roads; (c) the procuring of a larger percentage of large (round) coal; (d) reduced subsidence of surface. The cost of this flushing was 16.32c. per ton of coal hoisted, exclusive of interest, but the advantages accruing from the adoption of the method are estimated as equivalent to 12.48c. per ton.

Appended to his report on the Jamage Pit explosion Inspector Redmayne has a

note on the cause of spontaneous combustion in coal mines and methods of dealing with it, from which useful material may be culled.

Cause of Spontaneous Combustion

Usually gob fires are restricted to the wastes or abandoned areas or the pillar workings of the mine, but in some coal mining districts, though but rarely they occur in the solid coal on the road sides.

It used to be supposed that spontaneous combustion was caused by the heat resulting from the oxidation of the pyrites in the coal, the sulphide being converted into the sulphate, but Mr. Redmayne says this has been shown to be false. That the pyrites, especially if finely disseminated throughout the coal, contribute to the heat is no doubt true, the manner of the occurrence of the pyrites being more important than its amount. The chief cause is, however, the absorption of oxygen by the coal, and its combination with the carbon and hydrogen of the latter.

M. Henri Fayol, has shown that small coal in heaps mixed with coal dust offers the most favorable conditions for heating; a conclusion which is in accordance with what has been observed in practice, for when coal becomes crushed, or is naturally in a finely divided state, it is much more liable to spontaneous heating. If, added to this peculiar physical structure, there is the presence of pyrites in a very fine state of division, there can be no doubt that this sets up the initial heating and renders the absorption of the oxygen more rapid in consequence because the change of the pyrites from a sulphide to a sulphate disintegrates the coal.

Mechanical Stowage

In those places where the hydraulic system of stowing the goaf cannot, be adopted, Mr. Redmayne suggests that the following precautions be taken with a view to prevent gob fires:

1. The extraction as far as possible, of the whole of the coal, even though it be of an inferior quality. 2. The withdrawal of timber, as far as is practicable from the abandoned workings, for the timber is more easily ignited than the coal. As Mr. Pickering put it "posts and cross bars do not cause the heating but they supply the tinder." If timber is left in the goaf it prevents the even subsidence of the roof and tends to leave open spaces, thus facilitating oxidation of material which would otherwise have been covered. 3. The packing of the abandoned areas as tightly as possible. 4. The building of gate road packs as wide as possible. They should be well and solidly built.

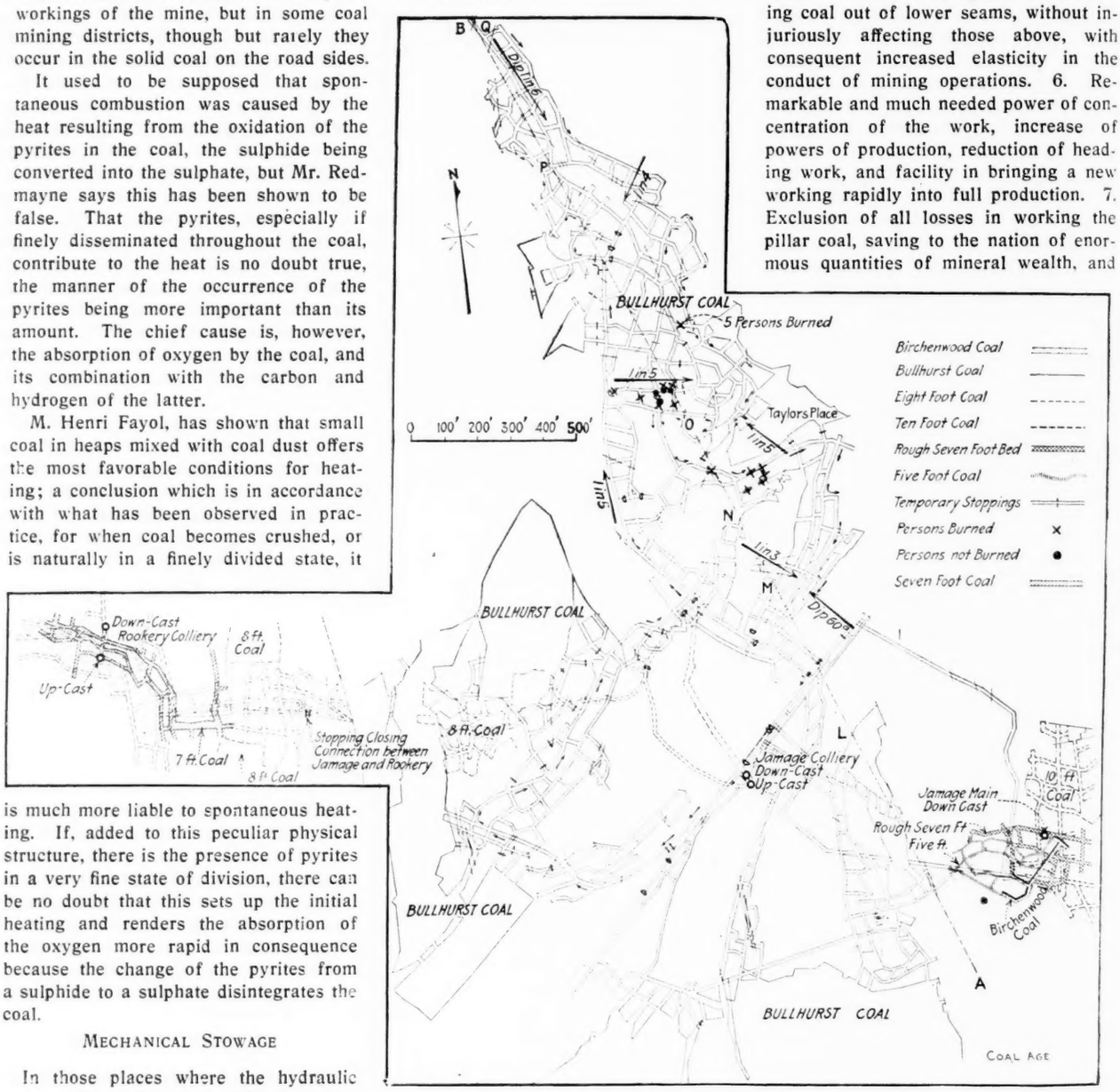


Fig. 4. Bignall Hill Colliery—Explosion Occurred at "Taylors Place" in Bullhurst Coal

Advantages of Flushing Workings

Bearing on the reference to stowage by Inspector Redmayne, it may be interesting and to the point to recall reports made to the last Royal Commission on coal supplies. Directing attention to the system of flushing (*versatz*) practiced in Upper Silesia, Consul-General, T. R. Mulvany, advances nine points in its favor as follows: 1. Increase of the working effect of the miner. 2. Reduction under given circumstances in the consumption of mine timber. 3. Effectual prevention of underground fires and the dangers connected therewith. 4. Favorable action against the dangers of firedamp, as all vacuities in the gob or in direct communication therewith are filled. 5. Possibility given of extracting coal out of lower seams, without injuriously affecting those above, with consequent increased elasticity in the conduct of mining operations. 6. Remarkable and much needed power of concentration of the work, increase of powers of production, reduction of heading work, and facility in bringing a new working rapidly into full production. 7. Exclusion of all losses in working the pillar coal, saving to the nation of enormous quantities of mineral wealth, and the winning of deposits which would otherwise be lost. 8. Thorough securing of the surface against damages through the regular and complete extraction of the coal. 9. Reduction to a minimum of the danger to life and limb from falls of roof and coal.

The great advantage of the system is that it brings with it no new dangers and that it obviates the many dangers of hand stowage.

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COAL AGE

The Mine Inspector and the Law

Upon the mine inspector rests the burden of seeing that the state mining law is enforced. He is appointed to enter and inspect all the mines in his district, for the purpose of ascertaining whether they are being operated in compliance with the law or whether some feature of the law is being ignored by the operator or the miner.

The work of mine inspection is not a simple task. If the inspector is faithful in the discharge of his duties, his path is beset with many difficulties, which call for the exercise of the highest and broadest qualities possessed by man. He must be guided in his action by a clear discernment, practical judgment, courage, patience and, most important of all, a good knowledge of human nature as it develops commonly in mines.

The mine inspector bears a relation to the mine similar to that of the police officer to the municipality. He is an officer of the law, duly authorized and charged with its enforcement, with the difference, however, that he has not, in most cases, been equipped with the necessary power to carry forward the work placed in his hands. He is handicapped by his helplessness—his utter inability, in many instances, to set in motion the ponderous machinery of the law that is necessary to bring offenders and violators of the law to justice.

So environed are the powers of the inspector by the network of political intrigue, that the office and work alike are many times exposed to the unmerited criticism of honest citizens, who, surveying the situation from a utilitarian standpoint, severely censure the mine inspector for his inaction and seeming disregard of conditions that should demand prompt and efficient attention at the hands of this officer of the law and guardian of the safety of mining operations.

This is no unreal tale, the product of a lively imagination, or the wailing of a pessimist, whose distorted vision beholds trouble where no trouble exists, and sees only confusion where peace and order reign. It is a fact that owing to the inefficiency of mining legislation, in many important respects, the mine inspector's authority ends with the bare statement of the law. His orders, in many cases, are only suggestions that may be carried out, or ignored by the operator who wishes to dodge the law.

To the honor of the larger mine operations, however, it can be truly said there is no evidence of a disposition to trifle with the law; or to ignore the slightest suggestion of the state mine inspector. The management of these operations consider it to be to their own interests to carry out every provision of the mining law and to further safeguard the men in their employ by regulations adapted to the special conditions in their mines. Not only do these mine officials assist the state inspector by giving him every accommodation in their power to prosecute his work; but they employ experienced men to act as private mine inspectors in their own mines. These men, also, work in harmony with the state inspectors, giving and receiving from them help and suggestions.

In general, the chief difficulties of mine inspectors are not with the management of large mining companies. When trouble arises it is with scattered interests whose desire and aim appears to be to regard solely their own individual ends. This class of operators consider themselves as the highest authority in the operation of their mines. They do not take kindly the suggestions of any one, and the mine inspector is regarded by them with suspicion, from the moment he enters their mine till he has finished his examination and departed. What a contrast is this in comparison with those mines where the inspector is welcomed and his work appreciated.

Naturally, the mine inspector is a conservative man. He studies conditions carefully, weighs in his own mind the various possibilities in each case, and reaches his conclusions by consulting his own experience and that of other equally competent men. This is the true character of the rank and file of mine inspectors to-day. They must often act as arbiter between employer and employed. It is this duty that has operated to mature the judgment and enrich the experience of the older inspectors—those who have years of service behind them.

Why should not this fact, the gradual growth and development of the true character of the mine inspector, appeal strongly for a long tenure of office; an appointment to office vested in the judiciary, and removed as far as possible, from the slightest taint of politics. The sad experience growing out of the election, by popular vote, of the anthracite mine inspectors, in Pennsylvania, followed by the more recent adoption of the same practice in Kansas, and Oklahoma, should demand, at this time, that, in the revision of the anthracite mine law now being made, this provision should be expunged, and in its place be provided that the office of state mine inspector be filled by appointment of the district court, for a specified term of years. Such an enactment would go far toward the vital improvement of the work of inspection of mines. Let the committee now at work on the revision of the anthracite mine law of Pennsylvania see to it that the new law thus provides.

Rolls of Honor

In the annual report of bituminous mines in the state of Pennsylvania, the chief inspector has recently published certain tables of honor—lists which record the names of companies operating for years without loss of life or with an enviably high record for coal production per fatality. "These tables show clearly," says the chief inspector, "the skill and care which have been exercised in the operation of the mines. The managers, superintendents and mine foremen have reason to be proud of the record."

As a matter of fact, we are unable to take any such view of the matter. We think honor rolls show most imperfectly the personal element involved in the prevention of accidents, but the report of the inspector seeks to induce us to believe that the officials of the company are more efficient where accidents are fewest, and that efficiency and safety are one.

We do believe that at several mines notable reductions in accidents have followed education, watchfulness and discipline. The improvements have justified the thought and labor spent on them. This is markedly true, not only in Pennsylvania, but in other states. The work of the H. C. Frick Coke Co., of the Coal Departments of the Delaware, Lackawanna & Western R.R. Co. and the Tennessee Coal, Iron & R.R. Co. point forcibly to the fact that accidents can be reduced by precaution.

But many of the names emblazoned on the rolls-of-honor are there because the roof of the mine was good, gas was absent, native labor abundant, and the dust was usually well dampened by natural moisture or not prone to be explosive. It is unjust to inspectors, superintendents, foremen and fire-bosses to measure all mine accidents with a common yardstick, and suggest that where deaths do not occur, a larger spirit of brotherly responsibility or a clearer understanding of mine problems exists.

The companies listed in the first three tables are not sufficiently well known to hazard about all of them the statement that they operate mines where the roof is good. But we can pick out a large number of them mining coal which is not covered by a drawslate, and where the grades are easy. Most of them are small and situated in country districts where farmers of American birth can be depended on to supply the mining force. Some are so small that had one fatal accident occurred, that single fatality would have raised rather than lowered the average fatality rate of the United States. It is by no means fair to rate the forces managing a mine or the inspector who examines it, solely by the accidents which occur or do not occur in those workings.

Looking over the companies thus mantled with the dubious honors of the first three tables, we are led to ask which of them have earned their position by anything else but a compliance with the mining law, and this has in some cases been but grudgingly rendered? Among these illustrious names are there many concerns listed which have organized first-aid teams or hired rib-bosses or timbermen? How many have institutes to instruct their men in the dangers of mining? We think but few.

Most of them would declare that the record shows that such provisions against accident are for them unnecessary. That would not meet the objection, for if it be so, the tables of honor are a superfluity, a tribute to those to whom tribute is not due. Rolls of honor should be rosters of those corporations which by experience, labor and foresight are reducing accidents and mitigating those that occur. To distribute honors to any but the worthy is to cheapen them and discourage such as would earn them fairly.

Adjusted Mine Air

We print today Karl F. Schoew's paper read before the West Virginia Coal Mining Institute, which deserves the attentive consideration from our readers that it received when read at Charleston. But it must be remembered that the article has specific reference to mines of which the temperature does not exceed 55 deg.

Despite the actual wording, we do not consider that Mr. Schoew is considering the maintenance of mines at a low temperature by cooling devices, when the temperature of the workings is normally above that which he favors. Nor do we think he would advocate adjusting the heat of the intake to 55 deg. at the mine mouth, when the valleys of the upper reaches of the Monongahela were steaming with air at 90 to 100 deg. His advocacy of moistening by steam does not seem to halt at those mines where temperatures are already excessive.

His statement that moving, saturated air is not undesirable, though at abnormally high temperatures, is contradicted by all those physiologists who by actual observation are acquainted with its effects, and are well fitted to testify. But there are few if any mines in America that would not be safer if Mr. Schoew's suggestions were adopted.

English authorities estimate that, taking into consideration all the uses to which the coal supply of the United Kingdom is put, they are getting back much less than 10 per cent. of the energy in the coal used. If this is true of England's coal supply, what must be the percentage of American loss where there are few by-product ovens, and where comparatively little attention is given to briquetting and fuel economy in general.

Colliery Notes and Comments

Practical hints gathered here and there, and condensed to suit the busy reader

Where oil and gas wells exist in conjunction with workable coal seams the greatest care should be taken to locate all such wells and protect them in the best possible manner, or serious explosions may result.

The Bureau of Mines is carrying on investigations to discover whether coal is a mixture of carbon, hydrocarbons and complex oxygenated molecules, or a uniform molecular substance of definite composition. The method of research is that of extraction by means of solvents, or treatment with chemical reagents, combined with systematic microscopical examination.

The ability of a briquette to retain its shape in the fire depends upon the elements of which the coal and the binder are composed. A binder should be able to hold the particles of coal together until the heat is sufficient to cause them to cohere of themselves. The caking point of different coals varies greatly. Bituminous coals are ready cakers at a low temperature, while it is almost impossible to cake some very hard anthracites at all.

An explosion is said to follow back on the intake more freely than it follows the return. Hence when the fan is a blower an explosion may be expected to direct itself most usually toward the fan. When it exhausts the explosion more frequently goes in the opposite direction. Some authorities declare therefore that a blower fan is more likely to be destroyed by an explosion, if such occurs, than is an exhaust fan.

Study your grate and by careful experiments determine just what size of coal is best adapted to the grate in question, because heat loss, loss of fuel and loss of efficiency of the volatile matter depend, to a great extent, upon the size of coal burned. Fine non-coking coals often needlessly increase the percentage of loss through the grate, especially when used on inclined grates in connection with either mechanical stokers or hand-firing. Where coal is too large for the grate too much air enters the fire bed and results in a high percentage of heat loss. Coal too fine for grates which admit a strong draft results in waste from unburned particles. Fine, porous, coking coals give good results as a rule if the coal does not pack too solidly and cause an uneven draft which makes a good fire almost an impossibility.

Special care should be taken to lessen the dust on haulageroads, where the dust sifts through the openings of the cars, or is blown from them in transit. All cars should be tight, and many experts now advise having them without doors. The coal should not be piled higher than the sides of the car. Strong sprays of water located at the partings or sidings, will wash the dust into the body of the car and prevent the air currents brushing it from the top of the loads. These precautions, together with proper loading, will greatly reduce the amount of dust usually found on haulageroads.

When cleaning a boiler fire, remove one-half at a time, turn the fire to one side with a slice bar, break up the clinkers and rake out immediately. Then turn the fire over on the other side, put on a little coal and clean the second half. Carefully level the fire, add a layer of small coal and close the furnace door.

If the ventilation of a mine is not all that it should be, watch out for the collection of gas in the gob. If this gas takes fire it will often ignite the gob, in which case the best thing to be done is to load out the gob on water cars as soon as the fire is discovered. At a recent gob fire in the Wyoming valley, as many as 50 cars of gob were removed from the intake side of a chamber.

Before starting permanent developments in a coalfield, be sure that the survey of the property is absolutely accurate, as much litigation has resulted from slovenly surveys. See that the property maps are not only a true plan of the mine workings, but also show the outside features, as much of the underground work is closely related to the outside topography.

An apparatus designed by G. H. Winstanley, mining professor at Manchester University, for giving practical training and instruction in the use of the safety lamp for detecting the presence and estimating the percentage of firedamp, enables a mixture of air, with firedamp and other mine gases as desired, to be prepared with accuracy in any desired proportions. This prepared atmosphere is then used to support the combustion of the safety-lamp flame in such a way that only the prepared air can enter the lamp and the cap thus produced can be observed and studied as long as necessary. The apparatus leaves the lamp free to be handled in the usual way, and any desired manipulation of the flame may be effected just as in actually testing for gas in the mine.

It is claimed that the Heilwood rapid lamp-testing machine will test two lamps simultaneously in a few seconds, subjecting each to a test of compressed explosive-gas mixture by the operation of carrying the lamp into the explosive mixture, mixing up the gas, firing off the lamp in the mixture, and then exhausting the gas from the chamber in preparation for the next charge. All this is carried out automatically and follows the mere pulling of a handle. The machine is power driven, made suitable for ordinary coal gas or acetylene, and is constructed throughout of iron or steel. It occupies very little room and can test about 600 lamps per hour.

A Derbyshire, England, deputy had his foot blown off by a high explosive. The detonator had ignited the explosive, the detonating pressure resulting in the explosive burning in the hole until sufficient force had been gathered to blow out the stemming. The deputy, noticing a glare as from a fire, went to the scene and found something burning on the floor. not suspecting it was anything dangerous, he put his foot upon it, and it exploded. After the man has been attended to, the place was inspected and it was found that the coal was intact, the shot having evidently blown the stemming only. The unconsumed part of the rippite (a permissible explosive) had fallen on the ground 5 ft. from the coal face.

The possible dangers attending the use of electricity in mines are being keenly discussed. It may be recalled that some were disposed to argue that electricity was a factor in extending the calamity in 1909 at West Stanley, Durham. Dr. John Wilson, M. P., drew special attention to the evidence of Doctor Thornton, professor of electrical engineering at the Armstrong College, in which he made it clear that the electrical plant was as good as any in the district, and that certain defects were general. Doctor Wilson appealed for the defects to be remedied, pointing out that while there may be expense, the life of the miners is in the balance, and the duty of the community is to the living. "Speaking for myself alone," he added, "I am convinced that the explosion was caused by electricity within the points fixed by the three mining experts."

Discussion by Readers

Comment, Criticism and Debate upon Previous Articles, and Letters from Practical Men

Booster and Tandem Fans

Letter No. 6—The claim made by the Illinois mine superintendent that his "booster" fan was doing effective work, in spite of the fact that the other superintendent questioned the efficacy of all "boosters," was justifiable and correct. In COAL AGE, May 25, you ask the question, "Is it possible to run a so called 'booster' fan to assist in ventilating mine workings where the circulation produced by another fan, either blowing or exhausting, is deficient?"

I note that you use the expression "so called" booster fans, which I think is a correct qualification, as many so called booster fans are, in fact, simply "borrower" fans; that is to say, they take air from the main current to ventilate side workings and the air thus taken may or may not rejoin the main current. I have used small fans for this purpose many times, underground, at points where the velocity of the main air current was too low to permit of splitting the current.

Referring to the first proposition; namely, "The conditions in the mine may be such that both fans are working on what are practically two distinct circulations"; it seems to me that, in this case, the second fan can hardly be called a "booster"; since, from the statement, the fans are practically independent and each fan will do effective work up to its capacity and efficiency. It is quite possible, also, that a careful rearrangement of the circulation and attention to the splitting may render the second fan ineffective and unnecessary. On the other hand, the workings may be so extensive that, in spite of the best possible arrangement of the circulation, the air on reaching the point of the second fan will be traveling at such a low velocity as to be readily picked up by the second fan and its velocity thereby increased.

In regard to the second proposition: "One of the fans may be run at a speed that is capable of generating a greater velocity in the air than that induced by the other fan." To reduce the discussion of this proposition to the simplest case, let us suppose there are two vertical shafts of equal depth connected by a straight tunnel. If the connecting tunnel is short, the second or exhaust fan will not only do no effective work itself but will actually retard and diminish the effective work of the first fan or blower. If, however, the tunnel is of indefinite length there will be some point in the same, where the friction will have reduced the velocity of the air below that which the second fan is capable of inducing; and right there the second fan will pick up the air and do effective work.

It seems to me that this latter case is comparable to that of a freight train on a heavy grade where two locomotives are used, one pushing and the other pulling. We will suppose that on a level track one locomotive is capable of attaining a speed of 45 miles per hour with this train, while the second locomotive can only attain a speed of 35 miles per hour with the same train under similar conditions. It is obvious, in this case, that the second engine simply adds to the weight of the train and reduces the effective work of the first engine. On the grade, however, the speed of the first engine is so reduced as to come well within that of the second engine, which promptly begins to pick up some of the load and the speed of the train gradually increases till the capacity of the two engines, under the prevailing conditions, is reached.

In the cases where I have used booster fans, the installation has been successful; and the two fans have done the work that was expected; but I do not argue from this, that all cases would be like successful. Probably the only reason that I have not met with failure in using a booster is because there was no reason for installing a second fan, except in places where it certainly could do no harm and might do some good.

My answer to your question: "Can two fans be run tandem, the one forcing and the other exhausting, on the same direct current" is—"Yes" and "No." Theoretically, perhaps, disregarding friction and leakage, the velocity being constant, "No." Practically, depending on conditions, "Yes" and "No."

JOHN T. FULLER,
Consulting Engineer.

Honesdale, Penn.

Letter No. 7—In regard to the question asked in COAL AGE, May 25, relating to "booster" fans, which it was said gave rise to an animated discussion between two mine superintendents, I want to say I do not blame the superintendent who declared he did not care what anyone said to the contrary, his booster fan was doing successful work. When a question like this has been demonstrated in a man's experience, it is impossible, I think, to make him change his mind.

There is no doubt but that the other superintendent referred to made a mistake in placing an exhaust fan at the top of the upcast shaft to assist the blower working on the downcast. In this arrangement, the exhaust fan was too far from its work; it would have given better results had it been placed half-way between the force fan and the upcast shaft, on the return-air current.

In answer to your question, "Is it possible to run a so called booster fan to assist in ventilating mine workings where the circulation produced by another fan, either blowing or exhausting, is insufficient?" I would say most assuredly it is possible. Not only is it possible, but practicable, which has been demonstrated time and again, in different places. I want to say, however, that all fans, no matter how large they may be, have their limit of capacity; and the quantity of air circulated will depend largely on friction, leakage of air through doors and stoppings, and the continual opening and shutting of mine doors to allow the passage of motors, mules and men. Mine fans are often taxed to the limit of their capacity by the extensiveness of the mine workings. The mine I am operating has two booster fans at work, assisting the two large exhaust fans outside, and the results obtained are gratifying.

In the circulation in our mine, to which I have referred, No. 1 booster fan exhausts from three different headings and forces the current of air through two other headings. The return current from this split unites with the return current of No. 2 booster fan, which pulls the air from three other headings. The return currents of these two booster splits, after uniting, enter the main-return current of the mine. This main-return current is also split, one portion going through an old entry, 3300 ft. long, where it unites with the main-slope current returning from another section of the mine, and passes out on the main haulage road. The incoming motors here offer a considerable resistance to the outgoing current, and would stagger the air current on the haulage slope were it not for the first split of air relieving the trouble.

The headings I have mentioned are all butt headings running parallel with one another, 250 ft. apart, more or less. No. 1 booster fan is a mile and a quarter from the outside fans, while No. 2 booster is a mile and a half from the same. I submit this for your careful consid-

eration, but must confess that I am highly in favor of booster fans, as my experience teaches they can be used to advantage.

Republic, Ala. G. T. M.

Letter No. 8—There is not the least doubt that the placing of several fans, in the same return airway, and but a short distance apart, is of no real practical utility. Personally, I do not know of any such arrangement, but have been told that there are such cases.

I understand that the purpose of a so-called "booster" fan is the ventilation of a district, in a mine, a considerable distance inby; so far, in fact, that the friction of the air has reduced the velocity of the current to a very low ebb. Or, again, the "booster" may be employed in mines where, owing to the high water gauge, the air leakage through doors and stoppings is excessive, so that the quantity of air furnished the inside workings is insufficient for good ventilation.

In these cases the "booster" fan to do effective work should be installed as far inby from the leakage as practicable. It should preferably be placed on the return airway, if the main fan is exhausting; but if the main fan is blowing, I would preferably locate the "booster" in the intake airway, as I believe the success or failure of a "booster" fan depends mainly on its position in the airway.

JAMES ASHWORTH,
Consulting Engineer.

Vancouver, B. C., Canada.

Inspection of Mines by Workmen

I was much interested in reading the editorial comment, COAL AGE, June 1, p. 1114, relating to the privilege accorded to miners by the Mines Act of Great Britain, which authorizes them to appoint two of their number who are practical workers, to inspect the mine, in company with the mine manager or one or more officers of the company; and provides further that every facility must be afforded the men chosen, to enable them to examine every part of the mine, including the shafts, levels, planes, working places, return-air courses, ventilating apparatus and mine machinery.

Having worked in gaseous mines, as a miner and a mine examiner (fireboss), in England, for about 26 years, and having studied the requirements carefully, during that period and for the nine years that I have been employed in the United States, I feel that the practice mentioned under the Mines Act of Great Britain is right.

The men appointed for this work, however, should be practical miners, who began work in the mine at the bottom or as trappers. They should be required to furnish proof that they have worked in gaseous mines and have the required experience, not merely the experience of a certain number of years, but an experience based on knowledge and practice. I had not heard before that the workmen were permitted to appoint any one of their number to examine the mine. It was never done to my knowledge when I was in England.

JOHN SUTTON,
Fireboss.

West Terre Haute, Ind.

[The reference in the editorial note, mentioned by our correspondent, relates to a provision of the new Revised Mines Act of Great Britain, 1911. Section 16 of this Act, entitled, "Inspections on Behalf of Workmen," reads, in part, as follows:

"The workmen employed in a mine may, at their own cost, appoint two of their number or any two persons not being mining engineers, who are or who have been practical working miners and have had not less than five years' experience in underground work, to inspect the mine; and the persons so appointed shall be allowed, once, at least, in every month, accompanied, if the owner, agent or manager of the mine think fit, by himself or one or more officials of the mine, to go to every part of the mine; and to inspect the shafts, roads, levels, workings, airways, ventilating apparatus, old workings and machinery, etc., etc."

We are informed that the H. C. Frick Coke Co. inaugurated a similar practice, in their mine, selecting men from among the workmen, to inspect the various parts of the mine and its equipment, and report any conditions that could be improved or that appeared to be dangerous from the standpoint of the workmen. The practice can be heartily indorsed as a good one, with, of course, certain limitations, inasmuch as it would give the company the benefit of the criticisms and judgments of the men in immediate charge of the works.—EDITOR.]

Speed Variation of Three-Phase Induction Motors

Your correspondent, H. V. Brown, of Syracuse, is quite correct in his criticism in COAL AGE of Apr. 20. The error in my article "Electrical Machinery for Coal Mines," published in the issue of Mar. 16, was due to a slip in dictating. Mr. Brown is right as to the fact that the number of poles and the number of revolutions multiplied together make up the periodicity. In the case of a generator, it is quite easy to see how this works out. There is required a certain periodicity. It can be made up by any combination of speed and pairs of poles that is desired (within certain practical limits of construction and operation). Thus, taking the periodicity as 3000, and the speed as 500, six pairs of poles are required. Further, increasing the speed, if the increase is of any magnitude, will upset the periodicity, and decreasing the speed has a similar effect.

In the case of a motor, the matter is not quite so clear, but the same argument holds. The highest speed, for a given periodicity of power supply, as Mr. Brown has pointed out, is obtained with the smallest number of poles. The periodicity of the current arriving at the stator coils is practically constant. The rotor must have an equivalent number of currents induced in its coils. If the speed is to be decreased, it must be done by increasing the number of poles, and *vice versa*. In practice, the machine is made for an output corresponding to the full number of poles, and its speed is increased by decreasing the number of poles; that is to say, by connecting some of them in magnetically parallel circuits.

For further variation of speed, the only method available with the induction motor, is the insertion of a variable resistance in the rotor coils. It should be noted that the higher the speed, the greater the power delivered by the motor.

SYDNEY F. WALKER.

Bloomfield Crescent, Bath, England.

The Acme Co's Plant in Wyo.

It seems to me that there are two things in the description of the Acme plant, appearing in your issue of Apr. 11 that are worthy of comment. While the writer is fully aware that long-distance criticism is apt to be worthless, based as it must be on incomplete data and information, yet a discussion of the interior of a house or houses, when the plans are furnished, may be ventured..

One is therefore, tempted to ask why are the bathrooms and water-closets in all three of the employees' residences placed so as to open directly into the kitchen instead of the bedrooms? The designer or architect must have had some definite idea in making this arrangement, and it would be interesting to know what this idea is; certainly the bathrooms and water closets are in positions that are directly contrary to the best sanitary practice and in the most inconvenient place possible for the use of the inmates.

The best plumbing ever manufactured could not make the arrangement shown, sanitary in the present accepted meaning of that term. The location of the bathrooms in the proper positions in these houses would have involved no extra expense in construction.

The method of construction with the outside weather boarding and sheathing over the concrete inner wall is interesting, but seems to be simply building a concrete house and leaving the outside forms in place.

The second point I have in mind is, have mining engineers or other persons any real right to patent a "system of mining?" I have many times wished to have this question answered to my satisfaction and have hesitated to state my views on the subject because I realize that I will probably stir up a hornet's nest of opposition. However, it is my opinion, unimportant as it may be, that patents should not be granted for systems of mining where special machinery is not used and where only the machinery alone should be patentable.

In the strict meaning of the word, a man who devises a system of mining invents absolutely nothing. He simply shifts a combination of things long known and used by others to suit the special requirements with which he may be confronted, and this new combination may be of absolutely no use outside of the particular mine or district in which it is applied. It would be just as logical in my humble opinion to grant a patent to a miner for driving a tunnel, using only six holes, when the usual number required was eight.

A brother engineer once told me, with considerable pride, that he had patented a system of mining that had never been used to his knowledge, outside of the one case in which he has himself applied it to meet the special conditions there existing.

Any mining engineer of resource and ability can and will if given time devise and successfully apply systems of mining to meet conditions with which he may be confronted; it is part of his job. A careful following of the technical press will convince one of the fact that many able engineers give freely of their knowledge and experience to their brothers without attaching any string to the information. This is as it should be. We none of us know it all, we all need and receive help constantly and should all be willing to give help in return.

Personally, whenever I have happened on anything which seemed to me to be good, and which might be of use to others, I have written a description of it and sent it in to one of the technical magazines, not with the idea of monetary return, but as an acknowledgment of the many free and valuable suggestions that I have received from others.

In conclusion, I want it distinctly understood that no personal criticism is aimed at the manager of the Acme Company for patenting a system of mining; but I do criticize the practice and the patent law which sanctions it.

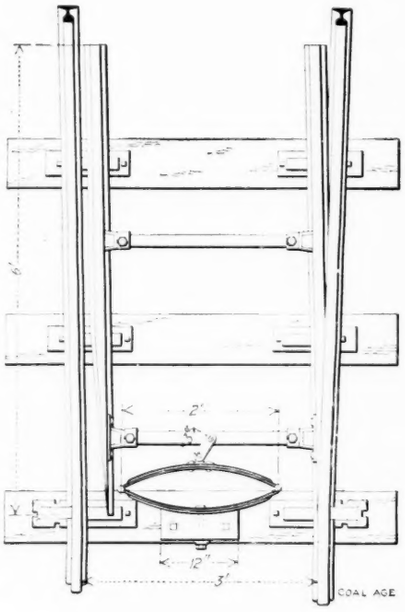
I hope that others of the engineering profession more capable than myself will see fit to give their views on this subject, for like all reasonable men, I am open to the conviction that my views are wrong.

JOHN T. FULLER,
Consulting Engineer,
505 Park St., Honesdale, Penn.

Device for Locking Switch Points on an Inclined Plane

Every mine superintendent who has operated or is operating a mine where the coal is lowered by gravity, will probably be glad to hear of any scheme that will automatically lock the switch points on an incline with three rails above and two below the parting.

It often happens that the parting point cannot be seen by the man at the drum, and he must trust almost entirely to good luck to properly land his trip. To know that he has a device that will positively lock the switch points relieves the drum man of a lot of unnecessary worry and makes his position more secure. It has been my lot for the last 18 years to be in charge of mining operations where gravity planes were used to lower the coal for transportation, and in the history of each plane, where the arrangement of three rails above the parting and two below it was used, a number of wrecks have occurred at the switch points.



SWITCH-LOCKING DEVICE

In Fig. 1 is shown a sketch of a contrivance which is simple in construction and positive in its action. It consists essentially of an elliptical spring (usually an old buggy spring) bolted to a block of wood and then made secure to a track tie, as shown, with its upper side fastened to the switch bar. Its action is to hold the switch point close to the rail, no matter which way the switch may be set. Each down-coming car automatically sets the switch for its own track and the spring practically locks the points in position, insuring a safe delivery of this car over the proper track to the head of the incline.

A. W. EVANS,
Superintendent.
Brushy Mt. Coal Mines, Petros, Tenn.

Electricity and Mine Explosions

I wish to draw attention to the following small item that appeared at the foot of p. 969, COAL AGE, May 4. The item states, "While it has been thought that electricity has been a contributing cause to some mine explosions, not a single explosion in an American mine has yet been traced directly to its use."

In regard to this item, I would like to draw attention to the explosion that occurred at Starkville, Colo., Oct. 8, 1910, in which 56 lives were lost. This explosion, I believe, is recorded as being directly due to electricity, having been caused by an electric arc igniting large quantities of dry coal dust, which was suddenly thrown into the air current. The ignition was supposed to have been brought about by the short-circuiting of the trolley wires, which were broken down by part of the loaded trip breaking loose from the motor. These, becoming derailed, knocked out several posts that carried down with them the conducting wires.

Perhaps other readers of COAL AGE can recall other accidents from a similar cause, which might have ended as disastrously as that at Starkville had the conditions been equally favorable.

A. G. HORROCKS.
Merrit, B. C., Canada.

[The statement to which our correspondent refers is an item used in making up the page. While the statement would be disputed by many readers and is at variance with some of the published reports of explosions, it is simply an expression of the uncertainty that exists in many minds on the correctness of the conclusions reached in the investigation of such explosions. The statement is a clipping worthy of some consideration and should be accepted for what it is worth.

In the investigation of every mine explosion, there is always much diversity of opinion in regard both to the location of the initial point of the explosion as well as the direct cause of the ignition of the gas or dust. Advocates of the use of electricity in mines for the purpose of power or lighting are prone to defend the argument that no explosion thus far has been traced to its use. Personally, we think this statement is a little strong. If the several reports of the Starkville, Monongah, Rock Springs and other explosions are taken as absolutely correct in their conclusions, this statement is wrong.—EDITOR.]

Examination Questions

Selected from State Examinations, or Suggested by Correspondents

British Columbia Examination for First Class Certificate, Held May 7-9, 1912

(Selected Questions)

Ques.—Suppose that in a fiery mine the quantity of air passing is 175,000 cu.ft. per min., measured in the return where the current contains 4 per cent. of firedamp when the barometer is 30 in.: (a) What quantity of gas is given off in the mine? (b) What is the least decrease in the quantity of air, that will render the return current explosive? (c) What increase of gas will render the return current explosive?

Ans.—(a) The volume of gas in the return-air current or the quantity of gas given off in the mine each minute is $175{,}000 \times 0.04 = 7000$ cu.ft. per min.

(b) Assuming the lower explosive limit of the gas is reached when the proportion of gas to air is 1:13, the quantity of air in the current at this point would be $7000 \times 13 = 91{,}000$ cu.ft. per min. The quantity of air entering the mine at the present time is $175{,}000 - 7000 = 168{,}000$ cu.ft. per min. The least decrease in the volume of air, entering the mine, that will render the current explosive under these conditions is therefore $168{,}000 - 91{,}000 = 77{,}000$ cu.ft. per min. This answer assumes that there is no change of temperature between the intake and return currents. At the moment the danger point is reached the intake current is 91,000 cu.ft. per min. and the return current 98,000 cu.ft. per min., there being in the latter 7000 cu.ft. of gas.

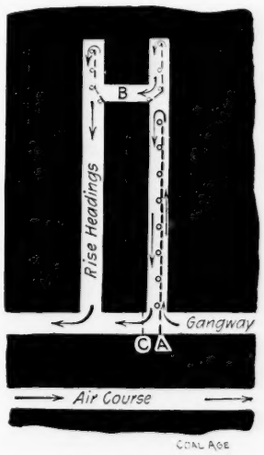
(c) Under the same conditions, the increase in the quantity of gas required to render the return current explosive is found as follows: The air current, 175,000 cu.ft. per min., contains 168,000 cu.ft. of air and 7000 cu.ft. of gas. The lower explosive limit will be reached when the quantity of gas is $^1/_{13}$ of the quantity of air; or, in this case, $168{,}000 \div 13 = 12{,}923$ cu.ft. per min. The increase in the quantity of gas is, therefore, $12{,}923 - 7000 = 5923$ cu.ft. per min. The total volume of air and gas in the return current is $168{,}000 + 12{,}923 = 180{,}923$ cu.ft. per min. The percentage of gas, at this point is

$$\frac{12{,}923 \times 100}{180{,}923} = 7.14 \text{ per cent.}$$

This is the lower explosive limit of marsh gas.

Ques.—How would you proceed to remove a body of gas from a pair of rise headings?

Ans.—Notify the men working on the return current from these headings. If the body of gas is considerable, all the men should be withdrawn from the return and all points of approach to this current should be carefully guarded before any attempt is made to remove the gas. Now, increase the volume of air in the affected district. Conduct the work from the intake side of the gas, using safety lamps only. Proceed with caution to erect a brattice extending from the gangway, at *A*, in the accompanying figure, up the intake heading. In extending this brattice give ample time for the air current to remove the gas accumulated in the heading. Conducted thus, the air current passes up on one side and returns on the opposite side of the brattice, as shown by the heavy arrows. Proceed slowly, testing the air, from time to time, at or near the end of the brattice, until the crosscut *B* is reached. The air is now made to pass through the crosscut, returning to the gangway by the second heading. To accomplish this, the brattice is moved forward on the gangway from *A* to *C* and the brattice in the heading is removed.



REMOVING GAS FROM RISE HEADINGS

In case the headings are driven beyond the crosscut, as shown in the figure, it will be necessary to extend the brattice up the heading from the lower rib of the crosscut to a few feet from the face, as represented by the light-dotted line. This, however, should not be done until the return heading is cleared of gas below the crosscut. After removing the gas from the first heading, the gas in the second or return heading above the crosscut is removed by extending the brattice from the lower rib of the crosscut, toward the face, in the same manner as in the first heading.

Ques.—What effect is produced, in a mine generating marsh gas (CH_4), when the atmospheric pressure is reduced from 15 lb. to 14 lb. per sq.in.?

Ans.—The fall of atmospheric pressure produces an expansion of the gases contained in the abandoned or waste places, in the mine. Assuming the temperature remains unchanged the gases expand in inverse proportion to the absolute pressure. The volume ratio of the gases is equal to the inverse, absolute-pressure ratio. In this case, the absolute pressure changing from 15 to 14 the volume changes from 14 to 15, or in the ratio $^{14}/_{15}$. The air and gases contained in the abandoned places are therefore expanded, in this case, $^1/_{14}$ of their original volume.

Ques.—A gaseous mine is divided into three sections, *A*, *B*, *C*. Section *A* contains a firedamp mixture consisting of one part of marsh gas and ten parts of air; the mixture in section *B* consists of one part of gas and less than ten parts of air; while that in section *C* is one part of gas mixed with more than ten parts of air. The gas is ignited in section *A*. Where would you expect to find the most deadly work done and which is the most dangerous section to explore?

Ans.—The firedamp mixture contained in section *A* is slightly below the maximum explosive point of marsh gas; while that in section *B*, containing a higher percentage of gas, is above the maximum explosive point; and that in section *C*, containing a smaller percentage of gas, is below the maximum explosive point. Assuming that all of these firedamp mixtures are within the explosive limit and take part in one general explosion, the afterdamp of the explosion will contain a larger percentage of carbon-monoxide gas (CO) in that section of the mine having the less proportion of air to gas, or in section *B*. It is in this section that the greatest fatality will result, not from the destructive force of the explosion itself; but from the effect of the afterdamp, which would kill all of those who survived the blast. On account of the deadly afterdamp in section *B*, this section of the mine would be the most dangerous to explore.

Sociological Department

For the Betterment of Living Conditions in Mining Communities

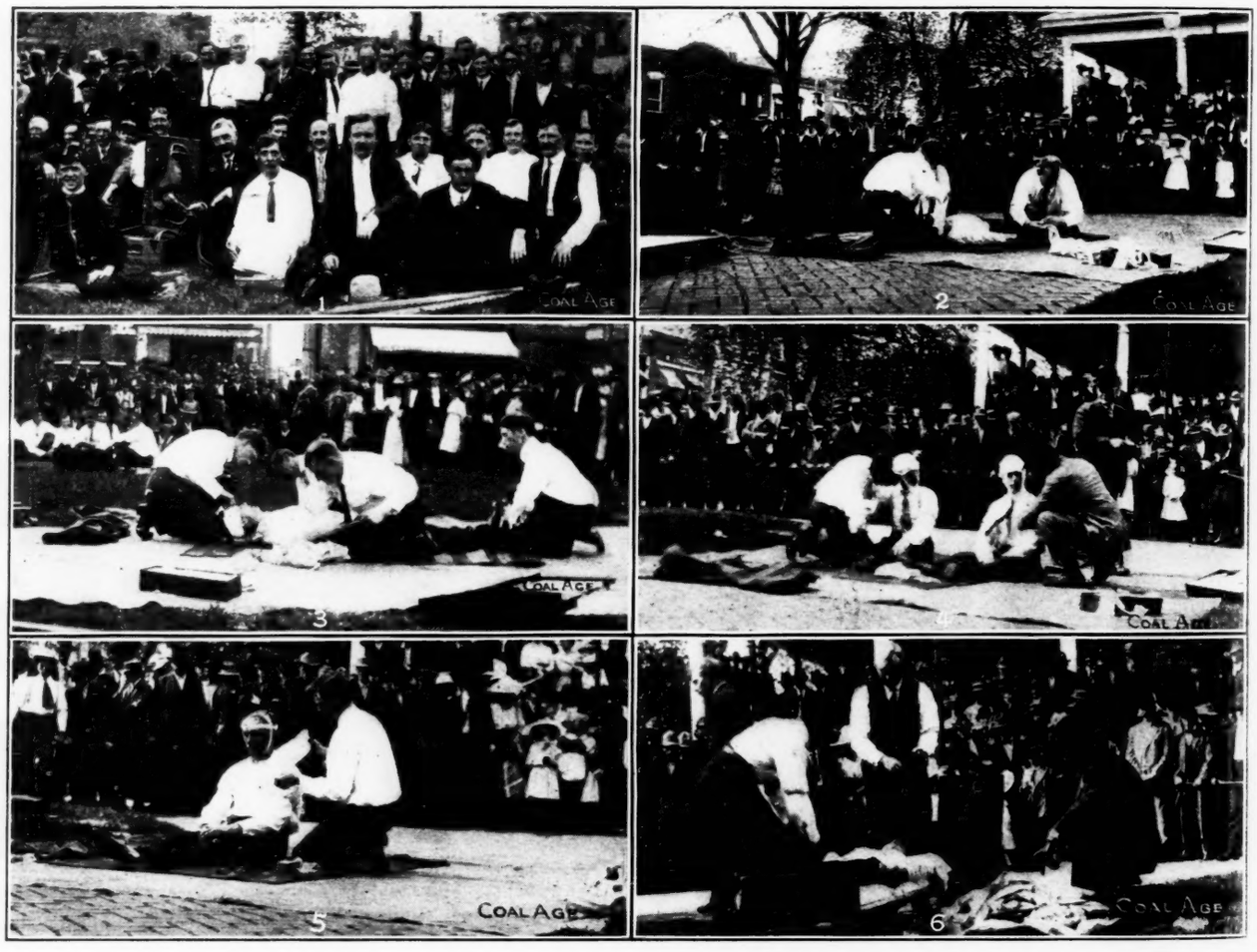
Inspectors and First Aid

Perhaps the inspectors will be as ready as any to admit that they are doing little work in the direction of first aid. The average mine inspector was a busy man even under the older laws, but he has had more demands made on him by recent revisions and is yearly required to make more exhaustive reports. He is constantly being urged to make more frequent inspections, and is finding that the complaints of labor unions often double his labors.

Consultations between mining inspectors and their chiefs also demand increasing time from the inspectional force. Numerous institutes, large and small, clamor for his time, and now first-aid has capped the climax. In many instances, regretfully realizing the legal necessity of the many duties which he must perform, he has been obliged to refuse to accept the most valuable and congenial labor because no legal provision demanded it.

In the Fourth Inspection District of Illinois, comprising the counties of Fulton, Hancock, McDonough, Morgan, Schuyler and Scott in the western part of the state, James Taylor, the district mine inspector, called a meeting of all the various first-aid and helmet men and organized them into an association. Nearly 100 men responded to the call on Apr. 30 and met in Canton, Fulton Co., Ill.

Addresses were made by Thos. English and M. F. Cummings of the La Salle Rescue Station. The officers elected were: Jas. Taylor of Peoria, president; John Roach of Canton, vice-president; Alexander Phillips of Canton, secretary; and George Mercer of Canton, treasurer. Six men were appointed captains of the several corps stationed at mines throughout the district, including Thomas Trigg at Cuba, Alfred Collins at the Drake Mine, Canton, Ed. Coulihan at Big Creek mine, St. David, P. W. Caufield at the Monmouth Coal Co.s, mine at Brereton Thomas Dickinson at the Norris mine and C. H. Murphy at the Eagle mine. A demonstration was arranged to take place on May 4, and to this the operators were invited. This took place in Jones Park. M. F. Cummings of the La Salle Station illustrated the rescue of a miner in low workings, dragging a man by attaching him to his belt and crawling along over his prostrate form.



SCENES FROM A MEET OF THE FIRST-AID ASSOCIATION OF THE FOURTH MINE-INSPECTION DISTRICT OF ILLINOIS. THIS ASSOCIATION WAS INSTITUTED BY JAMES TAYLOR, MINE INSPECTOR OF THAT DISTRICT

The events included (1) the treatment of a simple fracture of the left collar bone and of a lacerated wound in the palm of the hand, (2) the bandaging of a lacerated wound on the scalp and on the right shoulder; and (3) the first aid rendered to a miner who was supposed to have returned to the face of his room too soon after firing a shot and to have received a simple fracture of the right thigh, fractures of the middle, third, fifth and sixth left ribs, an open wound on the left temple and a compound fracture of the left wrist, severe bleeding resulting. The report to hand adds that the team is to carry the latter subject "over obstructions and treat." It is to be hoped that they reversed the order of procedure. If it should be necessary to move him a foot or so before treatment, dragging is better than carrying because fractures are thereby reduced rather than compounded. Moreover, severe bleeding can and should be treated at once, almost without regard to the shape in which the injured man may be lying.

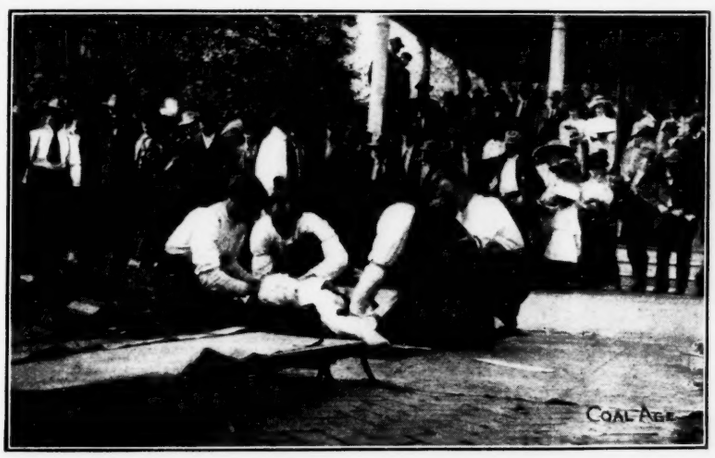


FIG. 7. CUBA TEAM NO. 2 TREATING A SUBJECT

Fig. 1 shows the members of the First Aid Association in a group. Fig. 4 shows three members of Patrick Caufield's team illustrating the first event, the victim on the left being so completely eased of the pain above his eye that he is taking quite an interest in the condition of the other victim at his side. James Taylor is standing watch in hand, while Dr. Chipping, of Canton is examining one of the subjects.

Figs. 2 and 3 show M. F. Cumming's team exhibiting the third event. In event 4 the subject was supposed to have a wound in the right temple and Horace Glover of Thomas B. Triggs' team is shown bandaging this wound in Fig. 5.

In event 5 a man was treated for a simple fracture of the right arm, between elbow and shoulder, and for a crushed foot with severe hemorrhage. Fig. 7 represents this event, which included the application of the tourniquet and of splints and the use of artificial respiration, laying the subject on a stretcher and placing same in an ambulance. The two Triggs, prominent among those taking part in the event, were trained in English ambulance corps. Fig. 6 shows Doctors Chipping, Adams and Rodgers examining the subjects after the bandaging was completed.

Ankylostomiasis

SPECIAL CORRESPONDENCE

One of the most valuable and interesting papers presented at the International Hygiene Exhibition in Dresden was one by Dr. Toth on "the mine disease," *ankylostomiasis duodenale*, also called, in addition to various purely local names, *chlorosis aegyptiaca, anaemia montana, anaemia tropi, anaemia St. Gotthardi, "worm sickness,"* etc. The cause is the ordinary intestinal worm: *ankylostomum duodenale Dubini*. The following causes have been assigned during the past three hundred years, for the symptoms of which the miners complain: working underground and in warm and moist air, or in air deficient in oxygen, sleeping in the mines, the action of metal dust or of fire- or afterdamp. In 1855 to 1858 Schillinger found that the blood of miners was unduly saturated with CO_2. But in 1881-92, during the boring of the St. Gotthard tunnel, where so many suffered from anæmia, the Italian doctors found in the corpse of a man who died from this little understood disease, the worm above mentioned. Perroncito came to the conclusion that the well known *anaemia montana* might be caused by the same parasite, and microscopic research revealed the *ankylostomum* in the excrement of the miners in Selmechánya, Hungary.

In 1803 Hallé described the sickness among the Anzin miners in France. From 1803 to 1830 the ventral form prevailed in the Anzin district; at first acute, then chronic. From 1830 it caused the general ill-health (chronic cachexia) of the sufferers and was marked by anæmia. It spread to coal mining districts in France, Belgium and Sweden; but did not appear in iron mines. The miners' sickness of Selmechánya in 1777-1792 was probably either a form of lead poisoning, or caused by unsanitary conditions.

"The worms" is a dirt disease. In many mines the miners are permitted to discharge their excrement anywhere in the passages, without the use of special receptacles; these being considered unnecessary because the water in the mines contains SO_2, which acts as a deoxidizer. The temperature, which is sometimes 68° F., favored development of the eggs of the worm. The pupæ found sufficient nourishment in the excrement and worked their way into the earth and water, eventually soiling the hands of the miners. In eating with dirty hands these germs were swallowed. They developed and multiplied in the bodies of the miners and grew at the expense of the strength of their unconscious "hosts," as physicians call the vertebrates which harbor such parasites.

When the mines are kept clean there is no such sickness, despite the high temperature. The larvæ live 3 to 5 years, despite dryness and cold; the worms can live 2 to 4 years in the human body.

The same disease is found in southern Hungary, Italy, southern France, Spain, Servia, Roumania, Greece and Turkey, among those who are not miners; but in Selmechánya it attacked the mine workers only.

In the Franz Joseph shaft 92% of the miners were troubled; in the Sigmund shaft 85%. The district has, since 1882, however, been entirely freed from the disease. This result was attained by forbidding the miners to deposit their stools on the ground, barrels containing iron sulphate being provided for the purpose. The method by which the eggs were introduced into the system by eating with dirty hands was explained to them. All dirt found in the mines was collected and the mine floors covered with sand. The miners who were already affected were given Merk's "Extr. fil. mar. æth. viride."

As a result, sickness and death have been diminished; there is less inflammation of the lungs, less typhus, and intestinal catarrh. The dues for sick fund and medicine are lower, although medicines are dearer. The workmen attain their 35 or 40 years of service and are pensioned. There are now fewer widows and orphans to support. The general health has improved. There are fewer weak and pale children; and the district can deliver its full quota of soldiers, whereas in former years it was always "behind the draft."

Coal and Coke News

From Cur Own Representatives in Various Important Mining Centers

Washington, D. C.

Unexpectedly to most persons, the House Committee on Interstate Commerce has reported a modified form of the bill designed to extend the Erdman Act to coal mining when the coal produced is expected to enter into interstate commerce. There was considerable opposition in the committee to the action taken but it was finally pushed through on June 5. The bill is therefore before the House of Representatives and may or may not receive attention at this session of Congress.

There is strong opposition to the adoption of this measure and under ordinary circumstances it would not be likely to make much headway. The House, however, is now in a somewhat peculiar position inasmuch as it has practically completed the bulk of its necessary work for the session, while the Senate is still dragging along at a slow rate. As soon as the appropriation bills are out of the way, which will be very shortly, the field will be thrown open in the House of Representatives for passage of general legislation. It is therefore quite possible that this bill may be debated at this session, particularly if there should be a somewhat further extension of the session beyond the limits which are now contemplated.

INVESTIGATION OF ANTHRACITE PRICES

The Interstate Commerce Committee has also reported the Difenderfer resolution calling for an investigation in regard to the increase in the price of anthracite coal as follows:

Resolved, that the Secretary of Commerce and Labor be, and he is hereby, directed to obtain and report to the House of Representatives, through the Bureau of Labor, full information concerning the different elements of cost and profit included in the present high price of anthracite coal, specifying as far as practicable how much and in what particulars the coal miners were benefited by the recent strike agreement, and how much and for what reasons and by what means the cost of coal to the general consumers was at the same time increased.

It is expected that this resolution will be passed by the House and that as a result, a rather extensive inquiry will promptly be initiated by the department to which the work has been entrusted.

The committee has also reported a resolution for a special investigation of the increase in the price of coal at Two Harbors, Minn., where, it is alleged, a local coal monopoly succeeded in advancing the rate on coal to the municipality when it undertook to purchase coal in order to reduce prices to the consumers.

BUREAU OF MINES APPROPRIATIONS

On Wednesday, June 5, the bill amending the Bureau of Mines act was passed by the House of Representatives with but little further modification and now goes to the Senate. The bill is substantially identical with the measure already outlined in this correspondence. What will be done with it in the Senate is problematical.

The appropriations committee of the House, in reporting the sundry civil appropriation bill on June 4, proposed the following appropriations for the Bureau of Mines and these will undoubtedly be adopted in their present form by the House of Representatives. No very material change is expected to be made in the Senate.

For general expenses, to be disbursed under the direction of the Secretary of the Interior, $66,100.

For the investigation as to the causes of mine explosions, methods of mining, especially in relation to the safety of miners, the appliances best adapted to prevent accidents, the possible improvement of conditions under which mining operations are carried on, the use of explosives and electricity, the prevention of accidents and other inquiries and technologic investigations pertinent to the mining industry, $320,000.

For the analyzing and testing of the coals, lignites, ores, and other mineral fuel substances belonging to or for the use of the United States, $135,000.

For one mine inspector for duty in Alaska, $3000. For per diem, and for actual necessary traveling expenses of said inspector, $3500.

For technical and scientific books and publications and books of reference, $1500.

For the purchase or lease of the necessary land, where and under such conditions as the Secretary of the Interior may direct, for the headquarters of five mine-rescue cars and for the construction of the necessary railway sidings on the same, $4000; provided, that the Secretary of the Interior is hereby authorized to accept any suitable land or lands that may be donated for said purpose.

Alabama

Birmingham—W. H. Skaggs, of Chicago, who is engaged in a railroad and coal development project in Tuscaloosa and adjoining counties, reports that the work is making excellent progress. The proposed railroad will run from Natural Bridge to Tuscaloosa and thence to the Gulf. At its northern terminus the new line will connect with the Illinois Central R.R.

The Tennessee Coal, Iron & Railroad Co. is firing up its bee-hive coke ovens at Nos. 3, 4 and 5 Pratt mines, because of some trouble with the new Koppers by-product coke ovens recently installed. Altogether 270 bee-hive ovens have been fired.

The U. S. district court in Baltimore, on June 3, signed an order restraining the Baltimore Trust Co. from selling $1,250,000 worth of bonds of the Alabama Consolidated Coal & Iron Co., held as collateral to secure notes for $330,000. The bill of complaint alleged that the conversion of preferred stock amounting to $1,250,000 into an equal amount of bonds by holders of the preferred stock was illegal under the laws of New Jersey where the company is incorporated.

The Merchants & Manufacturers Association of Birmingham, recently brought complaint before the state railroad commission regarding rates on coke from Yolande to Anniston and Gadsden. This rate is 70c. and the association has been struggling for several months to get it reduced to 50c. a ton. The complaint is directed against the Louisville & Nashville R.R.

Colorado

Denver—It has recently been reported that a $200,000,000 corporation was being formed to take over the Colorado Fuel & Iron Co. and the Colorado Industrial Co. This does not seem at all likely but it is possible that the Fuel & Iron Co. will consolidate with the Industrial Co. as it owns all the stock of the latter concern and there is no longer any reason why the two concerns should exist in separate form.

Illinois

Springfield—The state bureau of labor statistics recently reported that of the 844 coal mines in Illinois, 233 of them are operated by managements which have not elected to come under the new compensation act, effective May 1. These 233 mines, however, produced in 1911, four fifths of all the coal mined in the state. It is shown that the majority of the larger mines of the state are not operated today under the workman's compensation law.

A company has recently been incorporated here under the name of the Latham Mining Co., with principal office

in Lincoln and a capital stock of $45,000. It is the purpose of the new concern to lease and operate the Latham coal mine near Lincoln.

Belleville—L. E. Fischer, of St. Louis, has purchased a tract of 132 acres of coal land south of this place near Millstadt on the Mobile & Ohio Ry. He has let contracts for stripping the entire tract with steam shovels and it is understood that a spur of the railroad will be run to the property.

Marion—The Illinois Hocking Washed Coal Co. has filed papers increasing its capital stock from $50,000 to $100,000, fully paid.

Indiana

Terre Haute—The Sugar Valley Coal Co. recently leased 100 acres of coal lands in Sugar Creek Township for a number of years. According to the terms of the contract, the coal company pays to the owner a royalty of 3c. a ton on mine-run coal and 5c. a ton on screened coal.

Linton—The United Fourth Vein Coal Co., operating the Sponsler mine and the Island Valley mine No. 3 south of Linton, has leased the two properties to the T. J. Forschner Coal Co. for a period of 15 years. It is stipulated that the Forschner company will pay to the owners a yearly rental of $500 as royalty on the coal mines and $2000 for ten years' use of the tipple and machinery.

Brazil—At a meeting of the miners of District No. 11 at Seelyville, June 6, the removal of President Van Horn and other district officials was discussed by the men. The mine workers are somewhat worked up over the fact that they were thrown out of work for nine weeks, and since no strike was declared, were unable to draw strike benefits. They are inclined to place the blame for this state of affairs upon their district officials.

After declaring that the action of the bituminous miners and operators of District No. 11 would have no effect on their action, the block-coal miners of District No. 8 made a last stand for a weekly pay, but finally gave up this and other demands and ratified a wage-scale agreement, reached by the scale committee on June 7. The miners arranged to go back to work June 10 after being idle since Apr. 1. The men waived practically every demand they had made. The changes in the old contract are few, except the substantial raise in wages received in accordance with the Cleveland convention. This practically settles all differences in Indiana, and the miners are back at work in the principal fields.

Patricksburg—Following a conference between board members of the United Mine Workers and the operators who are working coal-stripping pits near Patricksburg, a strike of the 80 miners employed at the pits was ordered. A demand was presented by the miners for an eight-hour day, and a raise in wages of from $1.60 to $2.25 and $2.50. This was promptly refused by the companies. The men, who are ordinary laborers, were recently organized.

Petersburg—At the Borders Coal Mine, west of Petersburg in the Pike County field, a boiler exploded recently, wrecking the engine room and tipple and hurling fragments of the boiler a quarter of a mile away. The engineer had banked the fire, and the cause of the explosion is not known.

Iowa

Des Moines—Practically all the coal mines in Iowa resumed operation during the first week of June. As usual, however, following so long a suspension, not all the men were able to get back to work at once and it is thought the mines will be run on short time during the spring and summer.

Knoxville—Coal prospecting and mining work is being pushed with all possible speed in the various sections of Marion County, this spring. The English Creek Coal Co., which has one shaft in operation about two miles east of here, is busy prospecting the territory between Knoxville and Hawkeye. A new shaft has been sunk in the southern limits of this city, and one mile east of here a new mine has been opened in a 6-ft. seam of coal. The Anderson Co., of Des Moines, has one mine in operation and has just selected a site upon which to sink another shaft. In Liberty Township a new shaft is being put down, which it is expected will penetrate an 8-ft. seam of coal.

Kentucky

Lexington—C. J. Norwood, chief inspector of mines for Kentucky, presided over a conference of operators and superintendents held in this city, June 10 and 11. The chief object of the meeting was to discuss methods of preventing accidents. Mr. Norwood pointed out that the state is on the eve of a great expansion in its production and that it is especially desirable that steps should be taken to maintain the enviable record that has been held heretofore in the matter of accidents.

Cary—The power house of the Coleman Mining Co. here was struck by lightning recently and was put out of commission for some time. The machinery has been repaired.

Louisville—The miners and operators of western Kentucky recently submitted their differences as to the wage scale for machine mining to an arbitration committee consisting of William Green, Columbus, Ohio, and G. W. Sluedenburg, of Pittsburgh, Penn. This committee has been unable to agree and is confronted with the necessity of selecting a third person to act with them. The arbiters held a meeting in Louisville recently and listened to arguments on both sides of the question, presented by D. Stuart Miller, secretary of the Operators Association, and by Joseph Baker, of Central City, representing the miners.

Madisonville—It is reported that the plan for the purchase of 50,000 acres of coal land in Hopkins County known as the Buelah field, which has been pending for some time, will not go through. A hitch was caused by the failure of some of the land owners to clear the titles of their holdings, making it impossible to transfer the property. The syndicate which is said to be purchasing this land is composed of French capitalists.

Montana

Butte—With the founding of the Rocky Mountain Association of the United Mine Workers of America, the election of officers and the selection of Great Falls as the place of meeting for 1913, the meeting of the miners' delegates adjourned June 5 and the twelve representatives of the coal miners of Montana, Wyoming, Washington, Colorado and two districts of Canada left for their homes. The delegates to the first meeting of the subsidiary association of the United Mine Workers of America represented 51,300 coal miners in the West. Among the resolutions adopted was the following: "The most important thing this organization will persistently and insistently advocate will be the negotiation of wage agreements, covering wages, hours of labor and working conditions at one and the same time by all the coal-producing states belonging to the association."

Ohio

Columbus—Local coal men are preparing to make a strong fight for reforms in regard to weighing methods used by the railroads. The Interstate Commerce Commission has announced that testimony on this question will be taken in Columbus, June 24, 25 and 26. The coal men claim that they are losers by the present system, and that this is shown by the records of cars which have been reweighed. It is their contention that the stenciled weights on the cars are practically useless so far as showing the actual weight of the car is concerned because of wide inaccuracy.

St. Clairsville—The scale committee of miners and operators of the fifth Ohio subdistrict, in session at Wheeling, W. Va., reached a basis of agreement, on June 5, after wrangling for two weeks, and the proposed contract was submitted to the miners on the following Thursday for ratification. The bone of contention was a clause relating to "sticky bottoms." The men demanded extra pay for removal of this material, and the operators contended that to pay for this work would

increase the cost of production, which was contrary to their understanding of the Cleveland agreement.

Pennsylvania

BITUMINOUS

Ebensburg—A payment of $45,000 has been made on the options recently secured on 9000 acres of coal land in the Blacklick region of Cambria County. The original options on this land were secured some time ago, by James H. Gallagher, through S. L. Reed and Webster Griffith of this place. The optioning of this large amount of coal land is thought to mean that it will assuredly pass from the hands of the owners to operating companies. The Berwind-White company owns several thousand acres in this region and as its coal is entirely surrounded by the 9000 acres involved in the recent transaction, it is thought that the big Windber company may be providing for the future.

Monessen—The strike, which has been in progress at the Clyde Coal Co.'s mine, at Fredericktown, since the last of March, was settled recently by the company's signing an agreement to pay the Pittsburgh scale.

Somerset—It is now certain that the Loyalhanna Coal & Coke Co. will develop its coal lands in Shade Township in the immediate future, the point of opening in all probability being near Reitz. The superintendent of the company's Onnalinda mine, in Cambria County, is on the ground with a force of men directing preliminary operations.

Connellsville—Representatives of a Pittsburgh syndicate, which recently leased several hundred acres of coal in Milford, Black, Middlecreek and Turkeyfoot townships of Somerset County, recently inspected the property. It is generally believed that steps will be taken in the near future to develop the field. There is already considerable activity about Rockwood, and so far one mine has been opened along the Western Maryland Railroad.

Pittsburgh—The threatened eviction of the miners at Kaylor, from the houses belonging to the Great Lakes Coal Co., took place on June 1, it is reported. Several weeks ago the mines were shut down because the men demanded payment on the basis of the Pittsburgh scale, while the company contended that it could not possibly run its mines at a profit and pay the advanced wage rate.

Officials of the Pennsylvania R.R. Co. recently made an extended trip of inspection to the properties of the Buffalo & Susquehanna Co., in the northern part of Indiana and Jefferson counties. It is thought that the presence and activity of Pennsylvania R.R. officials and surveyors in this region indicates that the company contemplates taking over the trackage of the Buffalo & Susquehanna Co. This move would give it a short route into Pittsburgh from the northern part of the state and open up a large field of new coal territory.

ANTHRACITE

Scranton—While practically all of the mines have been working steadily since May 26, it is not expected that a full production will be obtained until the middle of June. The scarcity of miners, many of whom left the field during the suspension, and the difficulty experienced in inducing some of the remainder to abandon their holiday, are the chief causes of delayed activity.

The men recently on strike at the Fernwood Slope of the Hillside Coal Co. have returned to work.

Wilkes-Barre—The employees of the Harry E mine, of the Temple Coal & Iron Co., struck recently in regard to a grievance over their working hours, but at a subsequent conference with the mine officials, a settlement was reached.

At a meeting held here on June 2, hoisting engineers throughout the region decided to become affiliated with the United Mine Workers' organization. Hoisting engineers will participate in the advance of 10 per cent. in wages recently granted to the miners.

Hazleton—Because a number of the men employed at the Hazlebrook colliery of J. S. Wentz & Co. were not members of the miners' union, the 300 employees at that place called a strike recently and tied up the plant. It was expected that the few men not in the organization would agree to become affiliated with the Hazlebrook local union.

Pottsville—Claiming that a union miner was discharged without cause, the employees of the St. Clair Coal Co., near here, recently demanded that the man be given back his job, and when the company refused, the men marched out, completely shutting down the operation of the plant. The St. Clair colliery is one of the largest producers in this region.

Tennessee

Chattanooga—Announcement has been made here of the purchase of 22,000 acres of coal land on the Cumberland plateau, near Chattanooga, by a New York syndicate. Members of the syndicate are closely connected with the Durham Coal & Iron Co. and the Chattanooga Estates Co. The lands are estimated to contain 100,000,000 tons of Sewanee coal of high quality. Byproduct-coke ovens are to be built by the new owners and it is asserted that the output of coal in this district will be increased by 1,000,000 tons a year. Numerous other improvements are contemplated in connection with the development of this property.

Knoxville—The Society of Mine Foremen of Tennessee is endeavoring to secure a mine-rescue car for location in Tennessee, and has taken the matter up with Congressman R. W. Afton. This car, it is urged, should be located in Knoxville, as it would then be in a central position for serving Virginia, Kentucky, Tennessee and Alabama coal fields.

West Virginia

Wellsburg—The property of the Rex Carbon Coal Co., of Brook County, will be sold here at public auction, on June 21. The property is situated in the Cross Creek and Buffalo districts, of Brooke County, and consists of approximately 220 acres of surface land and 3000 acres of coal land.

Bluefield—Search of the cabins of the miners at Wacomah and the confiscation of a large quantity of ammunition and Springfield rifles have served only to increase the hatred of the striking miners there for the Baldwin-Felts detectives, at whom they have fired several volleys during the past few days, resulting in the death of one and injury of several others. The arrest of 20 of their number has also incensed the miners. There has been desultory firing about Wacomah for two weeks. Besides those at Wacomah, the miners at Mucklow, Paint Creek and Boomer are armed and in an ugly mood, and Gov. Glasscock has been asked to send the militia. The situation is so serious that Adjt. Gen. Charles D. Elliott has been sent into the field to make an investigation, and on his report will depend whether or not the governor will send the state troopers to the field. The trouble has been on in these mines since Apr. 1. Some of the men are in favor of returning to work, but are prevented from doing so by the others. The operators insist they will resume operations, but any attempt to do so is certain to be followed by rioting.

Spain

Madrid—The strike of coal miners in the Asturias district is becoming more serious. On June 5, the men attempted to forcibly restrain work at the pits with the result that the civic guard interfered and a fight ensued in which one person was killed and several were wounded. Fifteen thousand miners are on the strike in the region and the government has dispatched troops to the scene.

Belgium

Brussels—The outbreaks here, following the general election, have resulted in the calling of a general strike in the coal-mining districts of the province of Hainaut. The strike is now effective throughout the districts of Liége and Borinage. Many thousands of men are idle; at La Louivre 15,000 men are said to have quit work.

Personals

Walter Harris, of Kemmerer, Wyo., mining engineer with the United States Coal Co., recently made a trip to Salt Lake City on business connected with the Lincoln Coal Co.

M. E. Wadsworth, the retiring dean of the school of mines of the University of Pittsburgh, was recently presented with a loving cup by the students and alumni of the school.

William Hutchinson, who has been mining engineer for the Hillcrest Coal & Coke Co., at Hillcrest, Alta., recently left that company's employ to take up similar work in northern Alberta.

John Gibbs, Jr., formerly of Pittsburgh, Penn., on June 1, retired from the position of superintendent of the Union Colliery, Vancouver Island, B. C., one of the operations of the Canadian Collieries (Dunsmuir), Ltd.

A. H. Wood, formerly president and general manager of the Big Brushy Coal & Coke Co., of Petros, Tenn., has transferred his interest in the company to George P. Howard, of Atlanta, Ga. Mr. Wood will, in all probability, develop a new mine in the Dean seam in the immediate vicinity of Petros.

James J. Stoker has been appointed superintendent of the Cambria Steel Co.'s coal mines, succeeding George T. Robinson, of Westmont, who recently resigned. Mr. Robinson was presented with a silver loving cup and a gold watch by the employees of the Cambria mines, at a dinner held in his honor some days ago.

V. R. Evans has been appointed general mine superintendent of the Big Brushy Coal & Coke Co., of Petros, Tenn. He was formerly associated with R. A. Shiflett, of Harriman, Tenn., where they were engaged in a general engineering practice. Mr. Evans is a man of wide experience in mine management.

S. D. Warriner, vice-president and general manager of the Lehigh Valley Coal Co., has been elected president of the Lehigh Coal & Navigation Co., to succeed the late William A. Lathrop, and will take up his new duties on July 1. Mr. Warriner was graduated from Amherst College in 1888 with the degree of bachelor of arts and from Lehigh University in 1890 with the degree of bachelor of science and engineer of mines. He first entered the service of the Liberty Iron Co. in Virginia in 1890 and later in that same year went with the Lehigh Valley Coal Co. as assistant superintendent and later mechanical engineer, remaining until 1897. During the next four years Mr. Warriner was engaged as superintendent of the Calumet & Hecla Mining Co. and in 1901 returned to the Lehigh Valley Coal Co. as general manager, later becoming vice-president.

Book Review

MODERN PRACTICE IN MINING. VOL. IV. The Ventilation of Mines. By R. A. S. Redmayne, M. Sc. F. G. S., Chief Inspector of Mines, Great Britain. Longmans, Green & Co., London and New York. Cloth, 5½x8½ in., pp. 225, 2 folding plates, 107 other ill. and 21 tables. $2.10.

The author's name and official position is sufficient voucher for the value of this book and makes unnecessary any comment on its adequacy and accuracy. But because it is written by a man in authority, we must expect from the first that it will be prudent in statement and will not venture rashly into any controversial matters. As, moreover, Mr. Redmayne is much busied in the work of his office, it is also natural that the book should not contain any original research.

But it will be found of great value, the more so perhaps because nothing in it can well be questioned, everything having been proved by long experience. In a volume of the textbook class, such assurance of the correctness of its contents is not the least of its recommendations. The writer in a short preface labels it as elementary. Yet we think that few, even of the most advanced scholars, will read it without great advantage, and the more so because it is written by one whose reading and experience are not American.

There are advantages ever to be gained from listening to an author whose experience and reading have not traveled the same rut as our own. For instance, we have learned that in most, or all American mines, the firedamp consists almost entirely of methane, and that the ethane content is usually negligible where gas wells are not leaking their contents into the mine workings. But Mr. Redmayne informs us that a blower in the Schamburg collieries at Obernkirchen contained 37.38 per cent. of ethane.

Even the deep-seated natural gas of Pennsylvania and West Virginia, the infiltration of which the Bureau of Mines detects by testing for ethane, contains only 16.4 per cent. of that gas, while the Follansbee gas of West Virginia, which contains a large percentage of propane, only contains 21.8 per cent. It is interesting to note that Mr. Redmayne mentions the analyses of three blowers in mines in Westphalia and Silesia, which showed that the gas contained proportions of ethane.

And again, an analysis of a mine atmosphere on a dipping drift in Lower Silesia, showed not only 3.99 per cent. of ethane, but 1.87 per cent. of carbon monoxide, and 41.49 per cent. of carbon dioxide. Perhaps we may yet determine coals in America which break down partly into ethane and the monoxide of carbon.

It may be well to state also that the book is written in language not hard to be understood. So many English mining books require frequent reference to a glossary in order that the colloquialisms of the field in which the book is written may be eliminated. Some words not commonly used in the United States are to be found, of course, but to a very large extent Mr. Redmayne has avoided terms not having general acceptance. A little history enlivens the book and shows how slowly we have arrived at our present progress in the art of mining.

The subjects covered are the atmosphere of coal and other mines, the frictional resistance of airways, the instruments by which the physical conditions and volume of ventilation are measured, the varied types of fans, English and American, and the nature and means of preventing mine fires and explosions.

Construction News

Donkville, Ill.—The Donk Bros. Coal & Coke Co. will equip its mines here with several new 15-ton electric locomotives.

Peoria, Ill.—James Yocum, of Lewistown, contemplates installing electric mining machinery in his coal mine, at that place.

Canton, Ill.—The Simmons Coal Co. will, within the next 30 days, install a complete electrical plant for its mine at this place.

Des Moines, Iowa—The Blount & Evans Coal Co., Des Moines, will sink a new shaft for its mine. A tipple and top works are now in course of construction.

Harriman, Tenn.—The Tennessee Timber, Coal & Iron Co., of New York, is preparing to develop 25,000 acres of coal, iron and timber land near Nemo, Tenn. Bridges and railroads are now under construction.

Petros, Tenn.—The Big Brushy Coal Co. has been chartered with a capital stock of $100,000 and Geo. P. Howard in charge. The company plans to develop property in this vicinity for a daily output of 1000 tons.

Johnstown, Penn.—The Laurel Hill Valley Coal Co. has announced that at an early date it will award contracts for making two mine openings near the present operation at Humbert, and that electrical equipment will be installed at a cost of about $50,000.

Scranton, Penn.—The Pennsylvania Coal Co. is considering the erection of 150 concrete houses for employees of the Underwood colliery, which is being opened at a point between Throop and Marshwood. Work on the Underwood breaker is now well under way.

Fairpoint, Ohio—The Providence Coal Co., St. Clairsville, has acquired about 7000 acres of coal land, at Fairpoint, three miles from its present property, and plans to erect a tipple, to take care of the output of five openings. The mine will be operated by electricity furnished from the power station at St. Clairsville, where two new motor-generator sets and two additional boilers will be installed.

Earlington, Ky.—The Brent-Hart Mining Co. will make important improvements to its property at Mannington, near here. These improvements will include the installation of a new power plant, including a full complement of boilers and a large air compressor. Electrically driven ventilating fans and puncher mining machines will be installed, also shaking screens and a new hoisting engine. These and other improvements are expected to increase the output of the plant 500 tons per day.

Coal Trade Reviews

Current Prices of Coal and Coke and Market Conditions in the Important Centers

General Review

Considering the long suspension in the anthracite field, consumers are displaying a remarkable lack of interest in hard-coal. While orders are plentiful, they are by no means urgent, and the demand generally is far from being insistent.

Arrivals are coming forward slowly, and were the demand up to normal, the small movement would cause alarm. The large markets in which the sliding scale is in effect are being given the preference in shipments, and from present indications it is probable a number of the large distributing centers will go into the fall considerably understocked.

The Eastern bituminous situation is dull and quiet. The movement is small and there is no buying except at sacrifice prices, and consumers are not even displaying much interest in these. Conditions are not, however, materially different from this time last year, and there is a fair amount going into consumption and a good natural demand which does not seem to be indicated by the weak market. The steel industry around Pittsburgh is working up to its highest capacity, and the Lake coal movement continues good, but there is no improvement in the general manufacturing demand; prices are being shaded some.

The Ohio market generally is quiet, although there is considerable activity in Lake business, which is the best feature of the trade. West Virginia reports surpluses accumulating and shipments at the mines being curtailed. The Southern market is slow, but maintaining an unexpected firmness.

The Middle Western trade is unusually dull, but there is considerable contracting at good prices, which indicates a generally healthy tone. There is not much steam business, and operators are worried at the indifference of consumers to storing. About half the Indiana mines are again in operation, and production will soon be heavy if the railroads furnish sufficient equipment.

Boston, Mass.

Bituminous in the East is dull and there are few relieving features in the situation this week. Cargoes are still coming on consignment, and the inland trade is being scoured for orders. Apparently, with some of the shippers, it is a choice between holding cars on demurrage at Hampton Roads or netting losses at this end. There is no buying except at sacrifice prices. Aside from the very largest consumers, like the railroads, there is only a small volume of coal coming in on contract. Generally speaking, the soft-coal market here is lifeless, which applies to Georges Creek and the Pennsylvanias, as well as Pocahontas and New River.

Marine freights are still 70c. on large vessels, Hampton Roads to Boston, with little inquiry. Owners have declined to accept less, preferring to tie up.

Anthracite is coming forward slowly, and if there was any retail trade there would be alarm over the small receipts. The consumers are not, however, entering season's orders to the extent they have other years, and there appears to be a general impression that the retail price will not advance in the fall. It is rumored that New York and other markets, where a sliding scale is in force, are likely to get the largest share of summer shipments from the various companies. If June so far is any criterion, New England will go into the fall rather under-stocked.

Wholesale quotations are about as follows:

Clearfields, f.o.b. mine	$1.10 @ $1.30
Clearfields, f.o.b Philadelphia	2.35 @ 2.55
Georges Creek, f.o.b. mine	1.52 @ 1.62
Georges Creek, f.o.b. Philadelphia	2.77 @ 2.87
Pocahontas, New River, f.o.b. Hampton Roads	2.60 @ 2.70
Pocahontas, New River, on cars Providence	3.35 @ 3.50
Pocahontas, New River, on cars, Boston	3.35 @ 3.60

New York

Bituminous—There has been little or no change in the situation here during the past week. The market continues slow, as customary at this period, although it is said to be somewhat better than in previous years. The better grade fuels are moving off freely, and there is somewhat more than the normal contracting. Stocks at the piers are being cleaned up except in the lower grades, which as customary in a full market, are in poor demand. While trade will probably continue at the present level for a month or possibly two months, there is a good healthy undertone to the market and operators are anticipating a heavy demand in the fall.

We continue to quote prevailing wholesale prices as follows, although there is some shading from these:

West Virginia, steam	$2.35
Ordinary grades, Pennsylvania	2.45
Fair grades, Pennsylvania	2.55@2.65
Good grades, Pennsylvania	2.70@2.80
Best Miller, Pennsylvania	3.00
Georges Creek	3.15

Anthracite—Consumers are displaying little interest in hard-coal, despite the fact that the markets are practically bare of supplies. The demand is only in stove, and this grade is practically out of the market. Egg and nut are about holding their own, and there are plenty of the steam grades, barley being the scarcest of these and No. 2 next. Anthracite mines are now back to about 80 per cent. capacity, and the tonnages are slowly increasing. It is rumored that the Western markets are being given the preference in shipments.

The following are the wholesale f.o.b. quotations, those for the Lackawanna and Wyoming being at the upper ports and the Lehigh and Schuylkill for the lower:

	L.&W.	L.&S.
Broken	$4.70	$4.65
Egg and stove	4.95	4.90
Chestnut	5.20	5.15
Pea	3.50	3.45
Buckwheat	2.75	2.45
Rice	2.25	1.95
Barley	1.75	1.70

Pittsburgh, Penn.

Bituminous—Mills in the Pittsburgh district are using more coal than ever before in their history; the steel mills are running better, and the sheet and tin mills, which are very large coal consumers, are running at far beyond their record. General manufacturing demand shows no improvement, and the market on the whole is little if any better than a week or two ago, when the stocks accumulated against the expected suspension seemed to have been about all used up. Shipments in the Lake trade continue good, and there is plenty of vessel room.

Prices are only fairly well maintained there being considerable cutting by a few mines. The regular prices remain: Mine-run and nut, $1.22½; ¾-in., $1.32½; 1¼-in., $1.47½; slack, 82½c. Prices are being shaded, particularly in slack.

Connellsville Coke—The operators who are holding out for $2.50 for furnace coke on second half contracts are not closing business very rapidly, furnaces being quite averse to paying such a price when pig-iron prices have advanced so little. They are reinforced in their view of holding off by the fact that the spot market has grown decidedly easier, and it would be quite exceptional for contracts to be made at $2.50 when prompt coke is selling at $2 to $2.25. The issue is developing into a contest of strength. It is becoming generally accepted among consumers that if certain operators have no agreement, they at least have an in-

formal understanding of some sort which they are trying to live up to. There have been several contracts closed in the past few weeks at considerably less than $2.50, and the idea of the operators who are holding out may be that when such cheaper coke is cleaned up they will get their price. We quote: Prompt furnace, $2.20@2.30; contract furnace, $2.35@2.50; contract foundry, $2.40@2.75.

The *Courier* reports production in the Connellsville and lower Connellsville region in the week ending June 1 at 379,121 tons, a decrease of 15,000 tons, due doubtless to Memorial Day being observed at certain of the plants, and shipments at 4001 cars to Pittsburgh, 5981 cars to points west and 1379 cars to points east, a total of 11,361 cars, a decrease of 432.

Philadelphia, Penn.

There is not a particularly insistent demand for anthracite coal at the present time. While it is true the large operators are well filled with orders, they are not being overburdened with requests for prompt shipment. A consignment of a car or cargo seems to satisfy the average customer, and they seem to be content to wait until their turn arrives again. Every indication now points to a dull July and August.

The output at the mines is not yet up to normal, although it is understood that the men are gradually getting back to work and by the first of July, production will probably be back on a normal basis. Disappointment is expressed that more coal is not being mined, but it is a question whether the market would absorb the product if the mines were operating to their full capacity. The prepared sizes are moving off fairly well, but there is a noticeable falling off in the demand for steam grades. The particular size in demand at present seems to be stove, and outside of this, it cannot be said that there is any great scarcity.

Bituminous coal still continues in the rut, and the month of June only compares to May in that demand seems to be even less. It is understood that the market is well supplied with coal, and very little is being sent to tidewater. Some coals are being offered at prices which hardly net the operators sufficient to pay the expense of production, but it has to be sold. Better grades of coal bring from $1.10 to $1.20 at the mines. Short work at the mines is the rule, and at the present time there is nothing to indicate any improvement in the near future.

Baltimore, Md.

The Baltimore market has settled down to the usual summer business, which means there is little or no activity in the demand for fuel. Still the trade gets some consolation out of the fact that market conditions are at the present time no worse than during the corresponding period of last year.

Coal prices have dropped, but even the low figures quoted are not attractive enough for consumers to purchase for stocking purposes. From the office of a large operating company came the information during the week that 1500 tons of coal was dumped into Baltimore which remains in the hands of the companies that mined it. It was shipped in, with a view to disposing of it on spot orders, or short contracts, but purchasers could not be found.

There was some little interest in the bids submitted during the week on the Government contract for coal to be furnished the Naval Academy. It is understood that four Baltimore companies submitted bids, and the award will probably be made within the next 10 days. Prices named in the bids are higher than have heretofore prevailed, because of the specifications contained in the Government contracts.

Buffalo, N. Y.

The demand for all coal is still light. In the anthracite trade, the control is, of course, entirely in the hands of the operators, but in bituminous it is about as absolutely in the hands of the consumers, so that there is seemingly less and less profit in this grade.

There is a pretty fair amount of bituminous going into consumption, and the natural demand is good, though from market conditions it is not very apparent. It will take a large increase in consumption to absorb the excess of bituminous that finds its way into the market. It appears that other centers and mining districts are just as over-supplied, as, if anything is said of making an effort to stiffen prices, there is immediately talk of the low quotations made in the Clearfield district or West Virginia, both of which are ready to break into this market if prices are put up to any extent.

There is, however, the same effort as formerly to sell bituminous at regular prices, with at least some success, as follows: Pittsburgh, three-quarter, $2.57½; mine-run $2.47½; slack, $2.10, with Allegheny Valley, 15 to 25c. lower. Coke continues very quiet at $4.25 for best Connellsville foundry.

The consumers' indifference to anthracite is something of a puzzle to the shipper. Nobody is clamoring for any, though the country is practically bare of it. Dealers will accept shipments, so the plan is to distribute all arrivals as widely as possible. The principal effort from this point is to ship westward by water as far as possible. As yet only the D. L. & W. and Lehigh Valley have a supply for the Lake trade, but the others will be active soon. The report of water movement for May shows a trifle over 50,000 tons, as against 600,000 tons to June 1 last season.

The Buffalo city council has been making some effort to secure reduced prices on the annual school coal supply by readvertising after the miners returned to work, but it was at last decided by the upper house to do nothing. The lowest bidder was the Connell Anthracite Co., at $5 per ton, which was 75c. to $1 lower than the bids.

Columbus, Ohio

The coal market in Ohio during the past week has been rather quiet, with the exception of the Lake trade, which is now more active. In addition to a large tonnage from the Hocking Valley during the past few weeks, eastern Ohio has started shipping to the Northwest, and this is helping to make the trade more active.

The best feature of the market is the activity shown in railroad contracts. Coal men were expecting several of the larger railroads to award contracts soon, but in that they have been disappointed.

The congestion at the Toledo docks of the Hocking Valley R.R. is now about over and there is more steadiness in the movement to the Northwest. The chartering of boats at the lower Lake ports is going on fast, and it is believed the present season will be a large one in that branch of the business.

Prices prevailing in Ohio district are:

Hocking Valley	
Domestic lump	$1.50
¾-in	1.35
Nut	1.15
Mine-run	1.15
Nut, pea and slack	0.75
Coarse slack	0.65
Pittsburgh No. 8	
¾-in	1.25
Mine-run	1.10
Coarse slack	0.65
Pomeroy Bend	
Domestic lump	$1.50
¾-in	1.30
Nut	1.20
Mine-run	1.10
Nut, pea and slack	0.75
Coarse slack	0.65
Kanawha	
Domestic lump	1.40
¾-in	1.30
Nut	1.15
Mine-run	1.10
Nut, pea and slack	0.60
Coarse slack	0.50

Hampton Roads, Va.

Hampton Roads has experienced another quiet week, so far as the coal trade is concerned. There is quite a surplus of fuel now on hand, and shipments from the mines have been considerably curtailed. Practically all the coal dumped over the piers during the last week has been confined to contract business entirely.

While there has been some comment as regards prices, shippers at Hampton Roads are still holding for $2.70. From the tenor of the market at the present time, it would seem that conditions here

have reached a low ebb, but prospects for late June and July are much more encouraging. This is also borne out by the fact that vessel rates are striking up.

Charleston, W. Va.

John Laing, chief of the Department of Mines, expressed the belief that not only will the coal output of the state greatly exceed that of last year, but that the average price will also be much higher. Thus far the price to tidewater remains at $1.30, of which 10c. goes to the agents, leaving $1.20 to the operators.

Lakes shipments are still heavy and the prices, while not as good as to tidewater, are above those of last year, when as low as 65c. at the mines was quoted. The price today ranges from 90c. to $1.05. Despite the fact that the Lake season this year did not open until in May as against April last year, the shipments from West Virginia, in the opinion of Mr. Laing, will be heavier this year.

Birmingham, Ala.

Market conditions throughout the South show but a slight change during the week. Trade continues quiet, but is maintaining a firmness which some were doubtful about a few days ago.

Operators claim that there is no room for decreasing prices now that advances have been given in wages to the miners. To decrease prices would mean to lose money. Readjustment of conditions along the Mississippi River has stimulated the market in that quarter. Not only the usual commercial demand is resuming, but the railroads are operating again on a normal basis and taking more fuel.

Coal operators are expecting to find an outlet for surplus coal in the bunkerage and West Indies trade. The shipments on this class of business are larger now than has ever been known in the Alabama field. If American bottoms could be secured, it is claimed by one authority here, that a good deal of Alabama coal could be shipped to Tampa, Galveston and other American gulf ports, but it is almost impossible to secure the service.

Nashville, Tenn.

The west Kentucky coal field is experiencing the usual summer dullness, and there is absolutely no business. The usual low prices are being quoted by some of the operators, but they are accomplishing nothing, as far as moving coal is concerned, for the reason that there is no demand at any price and they are simply establishing a low level and getting no results.

There is a fair demand for screenings, but even this is not so strong as would be expected, in view of the fact that there is practically no domestic coal being run.

The present prevailing prices are as follows:

Standard lump	$1.15
Nut	1.15@1.25
Mine-run	0.80@0.90
1¼-in. screenings	0.40@0.50

Chicago

Despite the unusual dullness in the spot market, Chicago coal dealers are optimistic regarding the future. This is due to the amount of contracting and the prices that are being obtained. So far as the spot market is concerned, steam users are taking but little coal and retailers are absorbing still less, with the exception of what is forwarded on contracts.

Contracts are still being made for southern Illinois coal on the basis of $1.50 for lump, $1.35 for steam lump, $1.20 for mine-run and 80 to 90c. for screenings. The latter prices are dependent upon quality and size.

Some dealers predict there will be an advance of from 10 to 15c. on fine-coal prices in the open market within a few weeks. Quietness prevails in the anthracite trade. There will be little activity in this before the latter part of July or Aug. 1.

Prevailing prices at Chicago are:

Sullivan County	
4-in. lump	$2.47
Egg	2.37
Mine run	2.99½
Screenings	1.87@1.97
Springfield	
Domestic lump	$2.32
Steam lump	2.07
Mine-run	1.97
Screenings	1.97
Clinton	
Domestic lump	$2.27
Steam lump	2.12
Mine-run	1.92
Screenings	1.77@1.81
Pocahontas and New River	
Mine-run	$3.15
Lump and egg	3.55

Coke—Prices asked for coke are: Connellsville and Wise County, $4.75; byproduct, egg and stove, $4.65; byproduct, nut, $4.55; gas-house, $4.65.

Indianapolis, Ind.

About half the coal mines in Indiana were in operation during the past week. Before the end of another week practically every mine in the state will be working with a full complement of miners.

The railroads are furnishing cars promptly and a large amount of coal has been loaded. The operators say the remainder of the year will see a heavy production and that the annual output will not be decreased much on account of the suspension during the past two and a half months.

The retailer is now busy taking orders, and in some instances delivering next winter's coal. When deliveries can be made from the cars, this is done; otherwise the coal is stored.

The Indiana operators are being highly commended for the improvements made during the suspension. Considerable new machinery has been installed, and electricity is now furnishing power and light at many of the mines.

Minneapolis—St. Paul

Domestic coal is dull and there is not very much steam business just now. Wholesalers are beginning to worry at the apparent indifference of the dealers in regard to storing coal and the selling agencies are vigorously talking the probabilities of a car shortage owing to the bumper crop prospects.

Steam business in this territory is in a very unsatisfactory condition. In Minneapolis bids were received this week by the School Board to supply coal on the B.t.u. basis. In the standard kinds of coals bid upon there was considerable variation in the number of heat units and also in prices. Nine or ten companies submitted bids on Youghiogheny lump and the highest number of heat units a pound guaranteed was 15,300, the price being $4.90.

St. Louis, Mo.

There is absolutely no change in the local market, with the exception that prices are still being cut under what they were last week on contract coal. The purchasers are holding off placing contracts, as they can buy anywhere from five to fifty cars from every operator at a "trial" price. In this manner the contractors will negotiate until about August, and they will get the same price as at present.

There is very little demand for coal, with the exception of anthracite and smokeless, but the Illinois coals are not moving as has been anticipated. There is an increased tonnage moving in, and this has helped to demoralize the local market, while there is no country demand at all.

The prevailing prices are:

Carterville	
Lump and egg	$1.27@1.35
No. 1 nut	1.17@1.25
1½-in. screenings	0.80@0.95
Mine-run	1.05@1.10
Franklin county coal prices rule about 10c. higher than the above.	
Mount Olive	
3-in. lump	$1.15@1.25
Screenings	0.90@0.95
Standard	
6-in. lump	$0.90@0.95
2-in. lump	0.85@0.90
Egg	0.85@0.90
Nut	0.85@0.90
Screenings	0.80@0.85
Mine-run	0.80@0.85

San Francisco, Calif.

The vacation season has now commenced, which naturally means a falling off in household requirements, so there is little likelihood of a change for the better in the near future. On the other hand, deliveries of both the British Columbia and Australian products have

been very light and stocks have been reduced; in fact, the stock of coal now on hand in the wholesale and retail yards is abnormally small.

The government keeps on importing considerable Pocahontas for navy use. Last year it received 100,410 tons, and this year, up to Apr. 30, 33,290 tons. This month it has been bringing in coal from Colorado, which it intends testing out for steam purposes on one of its Pacific Coast vessels. Should the trial prove satisfactory, it certainly should tend to swell the receipts of Rocky Mountain coal.

Prices to dealers are as follows:

Wellington (British Columbia)	$8.00
Pelan Main (Australian)	8.50
Rocky Mountain	8.00
Cumberland	12.50

Portland, Ore.

Summer is now here in full force and the immediate demand for coal is, of course light, although it will soon be time to put in supplies for the winter, as storage rates are expected to be put in force in the near future. This means a dollar reduction per ton.

The shipments from Australia the coming fall are not likely to be heavy in view of the high freight rates now prevailing. The rates may be altered considerably as soon as chartering for grain carriers for the fall season begins in earnest. If high rates are offered for this business, ships in the vicinity of Australia will probably find it profitable to accept a lower rate for the run across the ocean than should the wheat offerings prove light.

Production and Transportation Statistics

Ohio Coal-traffic Statement

The following is a comparative statement of bituminous shipments over the principal Ohio railroads for the first three months of the current year and last year, in short tons:

	1911	1912
Hocking Valley	737,516	1,317,655
Toledo & Ohio Central	338,930	530,977
Baltimore & Ohio	444,841	758,184
Wheeling & Lake Erie	711,543	1,275,319
Cleveland, Lorain & Wheeling	498,740	920,001
Zanesville & Western	280,442	401,491
Toledo division, Pennsylvania Co.	522,545	1,995,351
Lake Erie, Alliance & Wheeling	324,166	415,265
Marietta, Columbus & Cleveland Ry.	9,151	37,457
Wabash, Pittsburgh Terminal Ry.	18,782	11,010
Kanawha & Michigan Ry.	14,107	59,532
		102,049
Total	3,900,763	7,624,291

Consolidation Coal Co.

From May 1 to 25, the Consolidation Coal Co. mined and marketed 815,000 tons, as against 711,000 tons for the corresponding period of 1911, or an increase of 104,000 tons. From Jan. 1 to May 25, the tonnage amounted to 4,111,000 tons, as compared with 3,283,000 last year, making a gain of 822,000 tons. It is estimated that the Consolidation will have mined and marketed fully 1,000,000 tons more of coal than it did in the first five months of 1911.

Island Creek Coal Company

The Island Creek Coal Co. reports a material gain in its April production of coal, the output exceeding 180,000 tons. For the initial four months of this year its output came to 625,000 tons.

Anthracite Shipments

The following is a statement of the anthracite shipments for May of the current year and the decrease over those for the same month last year in long tons:

	1912	Dec.
Philadelphia & Reading	201,575	1,021,475
Lehigh Valley	202,747	963,793
Central R. R. of N. J.	128,099	713,433
Del., Lack. & Western	277,140	609,400
Del. & Hudson	184,598	438,065
Pennsylvania	145,702	453,223
Erie	235,986	512,755
Ontario & Western	53,510	175,851
Total	1,429,357	4,887,995

Various Railroads, Rivers and Canals

The following is a comparative statement of the fuel movement over various railroads, rivers and canals for March, 1911-12[1]:

Railroads	1911	1912
Baltimore & Ohio[2]	2,609,658	3,938,462
Buffalo, Rochester & Pittsburgh[3]	668,936	867,070
Buffalo & Susquehanna[3]	194,768	208,317
Chesapeake & Ohio[2 4]	1,063,764	1,503,501
Erie[4]	611,094	1,248,828
Huntington & Broad Top Mountain[2 3]	113,375	165,649
New York Central & Hudson River[3]	711,662	939,141
Norfolk & Western[2 3]	1,475,012	1,934,916
Pennsylvania (East of Pittsburgh & Erie)[2 5]	5,674,834	6,790,231
Pittsburgh & Lake Erie[2 5]	1,197,752	1,472,676
Pittsburgh, Shawmut & Northern[3]	103,707	201,114
Southern[4]	305,684	352,926
Virginian[2 5]	191,774	303,159
Western Maryland	216,472	271,022
Rivers and Canals		
Barren River, Lock No. 1	421	344
Black Warrior River, Lock No. 12	76	600
Canal and Falls at Louisville	169,156	244,264
Chesapeake & Delaware Canal	3,195	11,767
Davis Island Dam	271,210	197,075
Green River, Lock No. 1	3,116	2,776
Kanawha River	168,740	150,340
Kentucky River, Lock No. 1	9,800	8,418
Monongahela River	1,010,191	1,046,201

[1]Figures throughout this table have been reduced to a uniform basis of short tons.
[2]Includes coal received from connecting lines.
[3]Includes company's coal.
[4]February two months' figures.
[5]Does not include company's coal hauled free.

Atlantic Coastwise Movement

The following is a comparative statement of fuel shipments, in long tons, from the five principal Atlantic ports for March, 1911-12, including bunker coal placed on vessels in the domestic and foreign trade and comprising probably 90% of the total shipments from these points:

Ports	1911	1912
New York	1,954,352	2,772,111
Philadelphia	578,420	610,790
Baltimore	369,112	402,438
Newport News	249,022	227,257
Norfolk	335,574	407,546
Total, 5 ports	3,486,480	4,420,142

Foreign Markets

Great Britain

The market has opened very slowly after the Whitsun holidays; most buyers show a disposition to wait until next week before entering into fresh business. Prompt supplies are fairly plentiful, but the tone of the market, taken on the whole, is steady. Prices are approximately as follows:

Best Welsh steam coal	$4.38
Seconds	4.20
Thirds	3.90
Best dry coals	4.26
Best Monmouthshire	3.84
Seconds	3.66
Best Cardiff small coal	2.40
Seconds	2.38

The prices for Cardiff coals are f.o.b. Cardiff, Penarth, or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days, less 2½ per cent.

Financial Notes

Utah Co. of Maine—The company was incorporated with $5,000,000 capital stock, all of which will be owned by the United States Smelting, Refining & Mining Co., to take over the Utah properties recently purchased in its interest, also to issue notes to be given in connection with payment therefor.

Woodward Iron Co.—The interest requirements of this company are $675,000 and a 6% dividend on the preferred stock would call for $180,000. Deducting this from the $1,000,000 estimated combined earning power of the property, there remains a balance of $145,000 for reserves and common-stock dividend.

The Delaware & Hudson Co.—This company will probably not do any financing this calendar year. No debt of consequence matures until June, 1916, and no large construction work is immediately in sight. The company had $1,921,784 cash Jan. 1. Floating debts on that date, including $900,000 loans payable, amounted to about $1,770,000. Such a condition of debt will scarcely lead the management to add to the present funded debt, especially in a none too favorable market.

Dominion Coal Co., Ltd.—The Dominion Steel Corporation, Ltd., owns $14,831,400 out of the $15,000,000 ordinary shares of the Dominion Coal Co., Ltd. The company owns or holds under lease a large proportion of the best coal in Nova Scotia, estimated at over 5,000,000,000 tons, with collieries having an output of 4,250,000 tons per annum, 110 miles of well equipped standard railway and modern plants for handling coal at Sidney and Louisburg, and for discharging coal at Montreal, Quebec, St. John and elsewhere.

Consolidation Coal Co.—Property account of this company amounts to $45,255,104 as follows: Coal lands and other real estate, $33,200,698, less reserve for exhaustion, $2,234,795; balance, $30,965,903; mining plants and equipment, $11,960,807, less reserve for depreciation, $2,309,495; balance, $9,651,312; Cumberland & Pennsylvania R.R., $3,248,463, less sinking funds for redemption of bonds, $655,685; balance, $2,592,778; Cumberland & Pennsylvania R.R. equipment, $122,489, less reserves for depreciation, $456,910; balance, $1,365,579; floating equipment, $1,166,950, less reserve for depreciation, $487,418; balance, $679,532.

Throwing The Searchlight On Advertising

Little Talks on a Big Subject for Coal Age Readers

By the Ad. Editor

"Advertising is the great epoch-making short-cut in business building. It has dynamic power—and it is like dynamite itself, in that it isn't a very good thing for the novice to fool with."

* * *

This message comes out of that brisk and beautiful, one-quarter French, four-quarters American City of the Straits, Detroit,—from the pen of Hugh Chalmers.

Everyone knows *him*.

The tale how he left the N. C. R., built a motor car, then, on "nerve," built a motor car company to sell it, is common property.

Hugh Chalmers is one of those fellows with the guts, go-to-it, and telescopic foresight, who have made Detroit the "Automobile Capital of the World" —as she is.

An example of the third quality, we might pause to say, came forth only last year when, under slackening business conditions and diminishing sales in every line, Hugh Chalmers went on making his cars at full capacity and storing those unsold cars on floor after floor of his warehouses.

He *knew* the demand would come back. Suddenly the call came: *"Cars!"* He had 'em.

And now, accept it from us, this man has the right idea about *advertising*.

Advertising is a *short-cut*—and it is *dynamite*.

* * *

Advertising is like the tunnel under the Hudson by which a man shoots in two minutes direct from Jersey to Manhattan instead of by the slower, uncertain, antique ferry boat.

Advertising *gets past* the slow, costly, illogical delays and wastes of has-been selling methods, good enough for one time—but not sufficient for ours.

It establishes the direct, lasting relation between the man who manufactures and him who eats, wears, uses.

It is the sure mile-a-minute tunnel train from maker to consumer.

But—*it is also dynamite*.

And no more than we would think of trusting a green workman to decide when, where, and how to set off a blast of giant powder in cutting a tunnel beneath the Hudson or under the streets and buildings of New York, with the uncalculated stake of life and proprety above, so no more *ought* we to think of trusting an irresponsible novice to handle advertising.

Advertising, wrongly used, can do tremendous almost irremediable disaster to advertising as a whole,—exactly as the persistently wrong and careless use of dynamite, when it was first placed on the market, *would have* created a lasting public prejudice against *its* use henceforth, *by anyone*.

A dishonest, misleading, exaggerated advertisement, skillfully written—spread big—will have the same destructive consequence as a blast of giant powder wrongly placed.

It'll *do things*—bowl over a horde of so called "suckers," most of whom, however, are just ordinary people like you and us, who have been gradually taught to believe in advertising sincerity.

What's the result?

When these people find they have been "stung," as the phrase is, their trust is just that much shaken in advertising as a whole. They suspect *all* advertising.

* * *

What would you do with a man who deliberately touched off a stick of dynamite under a Broadway sidewalk and maimed or killed dozens of people?

What would you do with a boss who allowed a green workman to handle explosives and so blunderingly to kill or endanger the lives of his fellows?

What should be done with the man who by irresponsible or dishonest handling of *the other dynamite*, advertising, shakes public confidence in this essential of modern business building?

The question is up to *you*, as much as anyone, for decision.

One way is to *squelch* such advertising into impotence *by neglect*.

And one sure way to do that is to patronize only the advertisements of the publication which *guarantees the exact truth* in its Selling Section.